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MULTIPLE CANCELLOUS EXOSTOSES.

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THE existence of multiple exostoses, though by no means rare, is seldom so well marked as in the following series of cases occurring in the same family.

As causative of or coincident with this abnormality, various factors in the family or personal history have been cited by different writers. Amongst these, *heredity* takes a prominent position. This is well seen in these cases, where the children have clearly inherited the exostoses from the father, whose sister and two brothers are similarly affected. Unfortunately, no reliable statement can be obtained as to their occurrence or otherwise in the grandfather or grandmother. The only fact worth noting with regard to them is, that between these two there was some 35 years' disparity of age, the man being the elder.

Syphilis, rheumatism, inter-marriage, have been noted as concomitants; but no history of these is present in the family. Needless to say, the obtainable data alike afford no support to the *retrograde metamorphosis theory,* which is largely founded on the fact that the sites of these exostoses correspond to an interesting degree to those of the ossified tendons in birds and of some bony projections normally present in certain of the lower animals.

Some evidences of *rickets* are seen. The accompanying skeletal diagrams indicate the positions and, as far as possible, the forms of the exostoses. The conditions of the aunt, father, daughter, and three sons are represented respectively. The accompanying engraving from a photograph (kindly taken by Mr. John Griffiths) shows the most prominent tumours in the boys.

Mr. Norton has courteously allowed the case of the youngest boy to be described, who was under his care in the hospital. An operation on this boy and its results are referred to in the text following.

Reference to the diagrams shows, amongst others, the following points (each scapula is seen in post-view by its corresponding side):—

(1) That the exostoses do not all originate from the neighbourhood of epiphyses.

(2) That in every instance they do originate thus, or from the usual sites of muscular attachment, or from both these positions.

(3) That the bones of the face and spinal column (to palpation), the sternum and patellæ, are exempted, and the bones of the head almost so; whilst the long bones, scapulæ, and ribs are extensively affected.

(4) That the pelvis (ilium) is affected in three of the six cases (B, D, and E).

(5) That sesamoid bones may exist concurrently with the exostoses (A and C).

(6) That the exostotic growth may bind together two adjacent long bones, *e.g.* the tibia and fibula of right limb of Case F; also lower ends of left tibia and fibula in Case E.

(7) That no exostoses of the subungual variety are present.

(8) That the disposition of the growths is to a high degree symmetrical.

The mother deems it quite possible the "bones" were present at birth, although their presence was not noticed till some weeks or months thereafter. In the father's case the tumours increased during childhood and until he was about 20 years of age, when they apparently ceased to grow, and, he thinks, since have somewhat diminished in size.

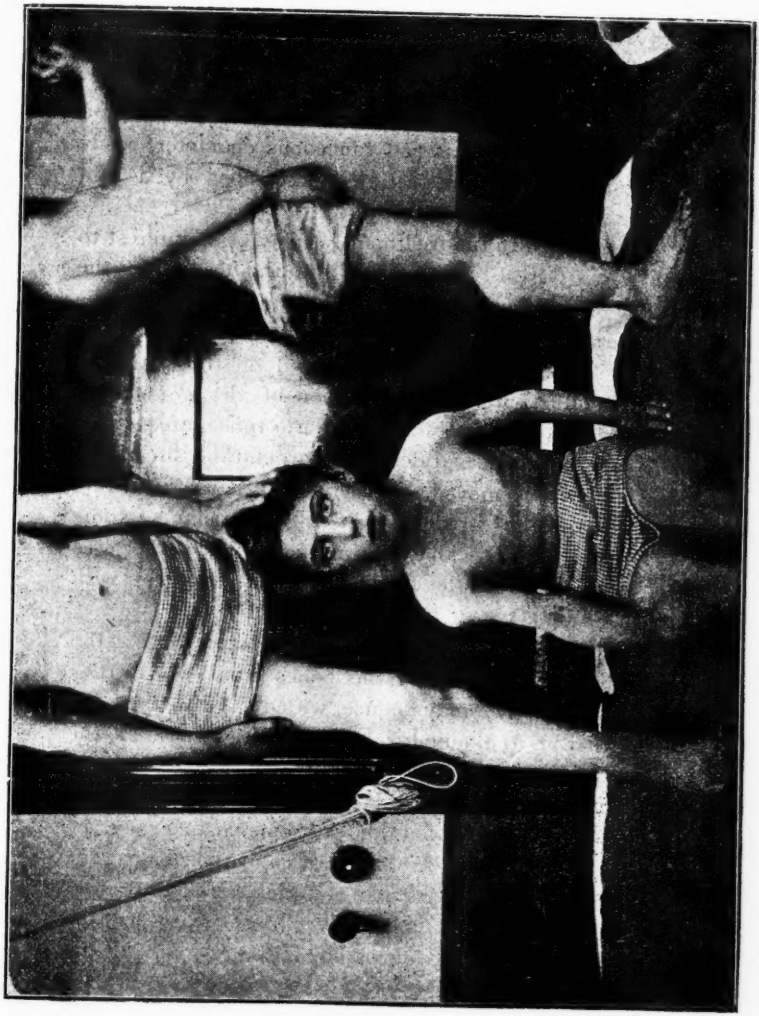
No inconvenience from their presence is said to be felt, excepting on the score of their position round the ankles. This interferes with the proper lacing of the boots, and, at times, the tissues superjacent to the exostoses in this situation become tender and somewhat inflamed, evidently from the undue friction between them and the boot during progression. Bursæ may be developed. The method of locomotion is normal, excepting in the case of the youngest boy, who has an enormous exostosis, about the size of a very large orange to palpation (see photograph, side view), springing from the posterior surfaces of the heads and from the upper third of posterior surfaces of shafts of right tibia and fibula. Little else seems to intervene between the palpating hand and the summit of the bony tumour besides skin and some probable subcutaneous fat; no muscular contraction is

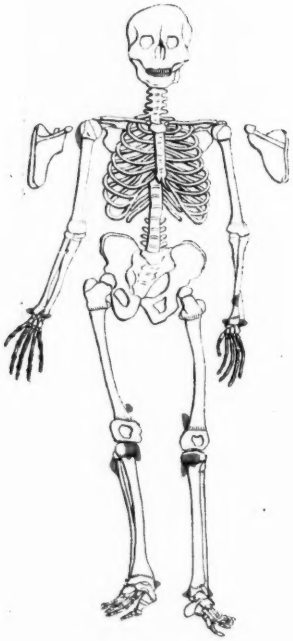
felt over it during pedal extension, and no displaced arteries or nerves are detected. The gait of this boy is somewhat "rolling," from side to side, and is rather of the nautical type.

The structure of the exostosis removed by operation (see *infra*) was of the usual cancellous character, easily cut, amply porous on section, and capped by a thin coating of cartilage.

With regard to the treatment, it may be of interest to record that Case F was admitted into the hospital for the removal of an inconveniently prominent exostosis on the left external malleolus. The removal was readily effected by Mr. Norton; and when examined on the sixth day after operation, firm primary union of the wound had occurred. But even in this short time three small accessory exostoses had developed around the site of the base of the one removed, and there was general thickening of the lower end of the fibula. In the course of some weeks this latter became less marked. The father was also operated on at the Infirmary, some years ago, with similar results.

The attached table indicates for the several cases the number of exostoses and the bones from which they grow. From it we may deduce, with regard to these six cases, that in the numerical order of affection of the bones the tibia and scapula stand highest; that of the long bones, next to the tibia comes the humerus; then the femur and fibula, followed at some distance by the radius: then the ulna: so that in the upper extremity, the humerus is more affected than the radius, and the radius than the ulna; whilst in the lower extremity, the tibia is more affected than femur or fibula, the two latter being about equal.





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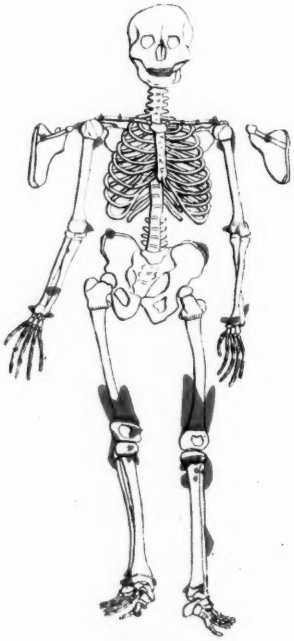

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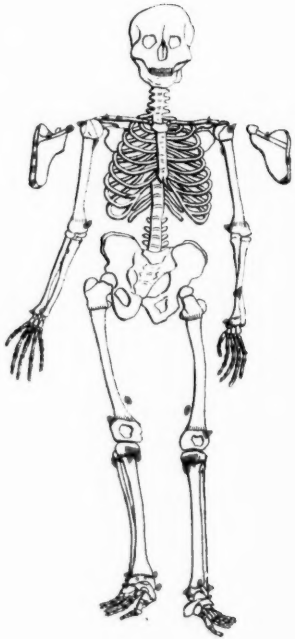

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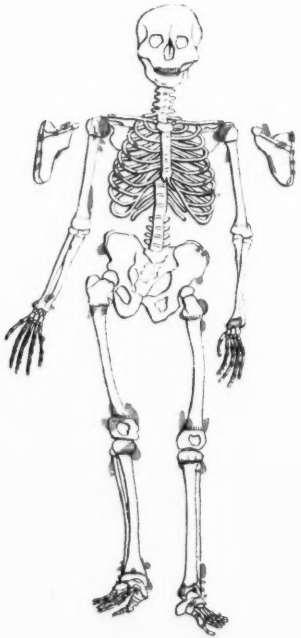
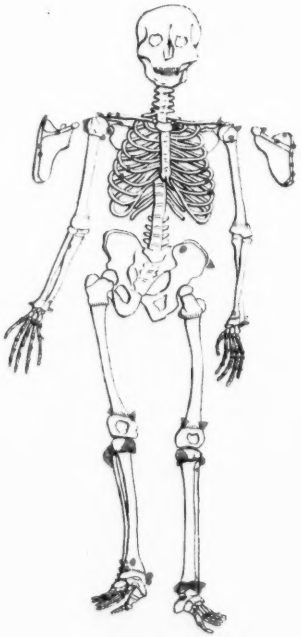
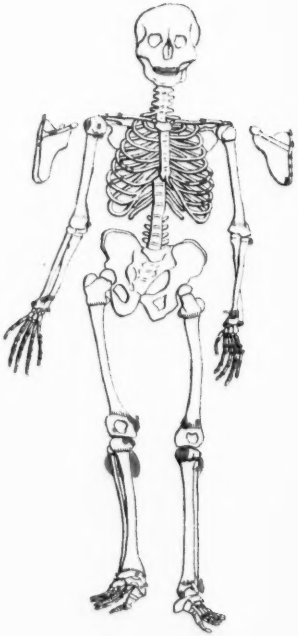


D



E



F

TABLE.

CASE	A		B		C		D		E		F	
NAMES OF BONES.	Sarah J., æt. 53, paternal Aunt.		Joseph J., æt. 43, Father.		Ellen J., æt. 16, Daughter.		Walter J., æt. 12, Son.		Herbert J., æt. 10, Son.		George J., æt. 8, Son.	
No.	RIGHT.	LEFT.	RIGHT.	LEFT.	RIGHT.	LEFT.	RIGHT.	LEFT.	RIGHT.	LEFT.	RIGHT.	LEFT.
3 Cranium	–		1 (over inion).		–		1 (over inion).		1 (left frontal).		–	
33 Ribs (on bodies) ..	–	–	–	–	–	–	7	5	3	3	7	8
19 Clavicle	–	–	3	3	2	2	1	1	3	2	1	1
50 Scapula	–	–	1	1	6	3	6	7	4	11	5	6
34 Humerus ...	1 (very prominent).	–	3	4	3	3	6	3	4	2	4	1
18 Radius	2	2	2	1	1	1	2	1	1	1	2	2
13 Ulna	1	1	1	1	1	1	1	–	2	1	1	2
127 Metacarpals and Phalanges	10	6	5	2	11	18	14	12	10	9	14	16
8 Os innominatum ..	?	?	1 (ilium)	1 (ilium)	–	–	1 (ilium)	3 (ilium)	–	2 (ilium)	–	–
28 Femur	–	1	3	2	1	1	5	5	2	2	3	3
51 Tibia	3	2	4	6	6	3	4	4	5	3	5	6
27 Fibula	1	1	3	2	1	2	2	4	3	2	1	5
1 Tarsus	–	–	–	–	–	–	–	–	–	–	1 on scaphoid tubercle	–
42 Metatarsals and Phalanges	–	–	2	–	6	7	8	5	3	4	5	2
Individual Totals =	31		52		79		108		83		101	

Total exostoses in six cases 454.

Again: that, excluding the hand-bones and scapula from the upper extremity, and the foot-bones with os innominatum from the lower, the latter is almost twice as much affected; but that apart from these exclusions, the order is more than reversed.

It will be seen from the diagrams that the growth is more exuberant at those ends of the long bones whose epiphyses unite later with the diaphyses, and less exuberant at those ends towards which the nutrient arteries are directed.

It is to be noted that in the case of metacarpals, metatarsals, and phalanges, by far the majority of exostoses are at the proximal and distal ends of these bones, and mainly on the dorsal aspect. A few, however, occur in the course of their shafts. Those near joints may cause marked distortion of a finger or toe, as in cases B and D.

There is outward-convexity curvature (supine position) of the left forearms of A and B, and of right forearm of D. In B, the whole of left arm is comparatively small, and the power of pronation and supination is lost, the radius and ulna being fused or bound together. (See diagram.) He attributes the condition to a wrench of the limb, during heavy work, when not 20 years of age.

This curvature (convex outwards) of *left* forearm has been not unfrequently recorded in conjunction with multiple exostoses: amongst others, by Jones, of Manchester Children's Hospital, in 1878, and later by Bruce Clark and Haslam, of Birmingham, in 1887. It has been attributed to overgrowth of the lower end of the radius, or defective development of that of the ulna.

The photograph has reference to the cases D, E, and F respectively, and exhibits the only visibly appreciable tumours of the group.

ON SOME VARIETIES OF PARAPLEGIA WITH LATERAL SCLEROSIS, WITH CASES.

BY

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I propose in this paper shortly to consider some cases of paraplegia in which the main symptoms were those that are taken to indicate sclerosis of the crossed pyramidal tracts in the spinal cord, and in which the arms were not affected.

The symptoms of this lateral sclerosis are paraplegia, with spasm and rigidity of muscles, and marked increase of myotatic irritability. The lateral sclerosis may arise in two chief ways: it may be the primary lesion, or it may be secondary (descending) to some other mischief in the cord. The symptoms resulting from it may exist unmixed, or be variously combined with concomitant symptoms due to disease of other parts of the cord, *e.g.* affections of sensation, ataxy of movement, atrophy of muscles, according as the lateral sclerosis is the sole lesion or is merely a part of the morbid process.

Adopting a pathological classification, in many ways the most convenient, we may divide the cases in which the chief or only symptoms of disease of the spinal cord are those due to lateral sclerosis, into two main groups: (I.) those in which the sclerosis, is primary in origin, and (II.) those in which it is secondary to some

other lesion which interrupts the fibres of the crossed pyramidal tracts in some part of their course.

These groups may again be sub-divided into the following chief varieties:—

I. (1) Primary spastic paraplegia, primary lateral sclerosis, or spasmodic tabes dorsalis (Charcot), in which the lesion is probably confined to the lateral columns.

(2) Cases of general paralysis (of the insane) in which signs of lateral sclerosis come on early and attain severe degree, while mental symptoms are slight and unobtrusive.

(3) Ataxic paraplegia in which the lateral sclerosis is accompanied by degeneration in the posterior columns and of the direct lateral cerebellar tract.

II. In this group are included:

(1) Cases of "compression paraplegia," in which pressure is exerted upon the spinal cord—(*a*) by tubercular or malignant disease of the vertebræ; (*b*) by new growths in the meninges (fibrous or sarcomatous, syphilitic, inflammatory, hæmorrhagic, or tubercular); (*c*) as the result of injury to the spinal column.

(2) In certain cases of partial transverse (focal) myelitis in upper or mid-dorsal regions.

(3) In cases of disseminated sclerosis in which the sclerosed areas are so localised as to cause a descending lateral sclerosis without implication of other tracts or of the grey matter of the cord.

(4) Congenital form of spastic paraplegia of cerebral origin.

(5) In certain rare cases of central tumour of the cord in the lower cervical or upper dorsal region, and possibly in syringo-myelia, as in a case mentioned by Strümpell.

Lastly: cases of paraplegia in which there is no organic disease of the cord, but in which the symptoms of lateral sclerosis are simulated by certain functional conditions, must be placed in a category apart. In the first variety of Group I., the lesion is presumably confined to the fibres of the pyramidal tracts, including their terminal branches on their way to the motor cells of the anterior cornua through the ramifications of the grey matter. Hitherto there has, I believe, been no direct pathological evidence of degeneration accurately limited to these tracts, but on clinical grounds the occurrence of a pure lateral sclerosis is almost certain. Dr. Gowers is of opinion that the degeneration may sometimes be limited to the terminal branches of the pyramidal tracts in the grey matter, in which case sclerosis in the lateral columns would not be found *post mortem*. It is a "system" disease of the cord; that is to say, that fibres having a definite common function, and gathered together in a well-defined group or tract of constant position in the cord, are alone involved.

The following two cases under my care exhibit the typical features of this affection, with its slow onset, absence of evidence of any focal lesion, and of sensory symptoms. The first patient had had syphilis severely; in a certain number of cases syphilis appears to be the cause of the degeneration. In the other patient, the first signs of spinal-cord disease came on after typhoid fever; it is rare to find spastic paraplegia dating its origin from acute disease, and it is interesting to connote with this the condition of increased myotatic irritability without rigidity often present after one of the acute fevers or other severe wasting disease.

Edward S., æt. 26, labourer. His mother died of

phthisis. He has had very heavy work as a labourer in the docks; has been accustomed to drink freely, and had syphilis five or six years ago. Eighteen months ago he had an attack, in which he thinks he was unconscious for a moment, but did not fall down. Since then he has noticed a very gradually increasing weakness and stiffness in both legs, but thinks that it began in the right. He suffers from a dull aching pain in the legs, and from cramping pains in the calves, with startings of the legs at night. There is obstinate constipation, but no bladder trouble. There has never been any affection of sensation. At the present time he is very weak, and trembles all over at the least excitement. He walks with both legs stiff and rigid, and moves them from the hips, without bending the knees; the toes scrape the ground as he walks, and the legs have a tendency to cross each other; he turns round with difficulty, and can hardly walk at all downhill. The muscles are well nourished and of good size; they react briskly to the Faradic and constant currents. There is great rigidity of the leg-muscles—clasp-knife rigidity; tickling the sole throws the whole leg into convulsions; there is knee- and ankle-clonus, and increased contraction to percussion of muscles themselves. Flexion and extension at knee and thigh decidedly weak. There is a little rigidity of movement about the right arm, and the tendon-reflexes are more active in the right than in the left arm. Otherwise the arms are unaffected.

All superficial reflexes present; no sensory affection; special senses normal; no loss of muscular sense, nor any ataxy of movement.

The second case was that of a charwoman, æt. 55, who had always had to work very hard. There was no history of alcohol or of syphilis. Seven years previously

she had typhoid fever, and for some time afterwards suffered from pains in the back and weakness. About five years ago a gradually increasing weakness in the legs came on, and after a time compelled her to give up work. She has had some aching pains in the back, but none in the legs. The legs "start" at night. Walking is difficult; and if she knocks her legs together in walking, she falls. On examination, she is anæmic and badly nourished. She walks very stiffly and with manifest difficulty; her toes do not leave the ground, but scrape along the floor; she is unable to put the heels to the ground at the same time as the toes, on account of contraction in the calf-muscles. She can only turn round with great difficulty. There is no ataxy of movement, and she stands steadily with eyes closed. The muscles of the legs are very rigid, especially the flexors and extensors of the knee; the calf-muscles are rigid when she stands, but when she is lying down rigidity is less marked. The knee-jerks are much exaggerated, and there is slight ankle-clonus; front-tap contraction well marked; superficial reflexes normal. There is no muscular atrophy, and no affection of sensation; the muscles react well to the Faradic current. There is slight tenderness over the upper part of the sacrum and fifth lumbar spine, but no sign of any disease here. The bladder and rectum have been throughout quite unaffected. All arm movements are performed normally and with good strength. There is no affection of the special senses, nor of any cranial nerves. A few small patches of psoriasis are seen on the elbows, knees, and trunk. This patient has been treated by suspension three times a week for some three months, and is certainly better. Rigidity is less; she can walk better, though she still scrapes her toes; she is much

stronger on her legs and can walk a great deal further. At the same time she has had the benefits of rest and good food whilst in the hospital, so that it is doubtful as to how much of the improvement can be attributed to suspension.

In certain cases of general paralysis (of the insane), the spinal symptoms predominate in the early stages, the mental symptoms are slight and indefinite, other of the more common signs are absent, and it may be doubtful as to whether we have to deal with a case of spinal cord disease, accompanied by slight mental failure, or with an irregular case of general paralysis. These cases are more likely to occur in ordinary hospital or private practice, and it is most important that the diagnosis should be made as early as possible, as it is only in the early stages of general paralysis that we can hope to check the disease. The spinal symptoms may indicate either that the posterior (type of locomotor ataxy) or that the lateral columns are affected: of the latter type, the two following cases are well-marked instances.

Albert C., a fitter, æt. 31 (in 1886). The patient's father was a heavy drinker, and a very nervous, excitable man, who could not bear the least noise when at home. The patient suffered from nocturnal incontinence of urine until ten years of age, and had a discharge from the left ear for some time. He had had rheumatism, but no syphilis or other illness.

I first saw him in October, 1886: he then complained of pains like cramp and stiffness in the legs, that he seemed to have no power in his legs, and at times could hardly drag himself along. His legs were drawn up when in bed; he complained of pains in head and temples, and that he could not bear any noise. His legs easily

"went to sleep" after sitting for some time. He walked stiffly, with slight scraping of his toes along the ground. There was rigidity, decided loss of power in the leg-muscles, with ankle-clonus and exaggerated knee-jerks on both sides; the superficial reflexes were brisk; muscular irritability to percussion (in legs). No affection of sensation; micturition and defæcation normally performed; pupils equal, acted well to light and accommodation. He was rather deaf; the other special senses were unaffected. These were the only symptoms at this time.

In December of the same year he had 24 "fits," in which there was momentary loss of consciousness; and for a short time after each fit he was unable to speak or to walk, and said that his limbs felt numb. After these fits he was much weaker; and his speech was not so distinct as before, showing a tendency to the blurring over of long words. His memory was bad, but he showed no other sign of mental failure; his friends stated, however, that he was apt to be excitable and childish at times, and had changed in disposition, showing no affection for his wife and family. He improved somewhat up till May, 1887, when he had another fit. The right pupil was now larger than the left; there was occasional nystagmus in lateral movements of eyes, and slight trembling of the lips.

After this, increase of paraplegia prevented further attendance at the hospital; he was unable to walk, but remained in much the same state mentally until December, 1887, when, after a severe fright, he became quite childish, and had delusions of grandeur. He was removed to an asylum, and after a time allowed to return to his friends. I saw him again in October, 1889: he was confined to his bed, was demented, could only utter meaningless sounds,

had great difficulty in swallowing, and loss of control over bladder and rectum. There was general muscular rigidity of arms and legs, with contractures.

In the following case the progress of the disease has been slower, but I have no doubt that it is one of the same nature as the foregoing.

John Q., æt. 34, a shopman, came unner my care in August, 1886. He had had syphilis; diphtheria in November, 1885; but no other illness. He complained of weakness in the back and legs, gradually increasing during the last four months. He was giddy, had difficulty in turning round, and the legs trembled after any exertion. He suffered from morning sickness, but denied any alcoholic excess. His memory was bad; he walked stiffly and somewhat ataxically; there was weakness and slight rigidity of the leg-muscles; exaggerated knee-jerks, and slight but well-marked ankle-clonus. Sensation quite normal. The pupils were large but equal, and the right optic disc pale and somewhat atrophied.

He came again in August, 1888, stating that he had remained in about the same state till a month ago, when he had a slight apoplectiform seizure, followed by paresis of the left arm and leg, which subsequently passed away. His skin was greasy; his speech slurred and indistinct. His gait stiff, uncertain, and of the spasmodic character described by Dr. Savage, the feet when advanced and placed on the ground appearing to have a tendency to jump up. The other symptoms were unaltered.

In December, 1889, the weakness and rigidity of leg-muscles were decidedly worse, and ankle-clonus more pronounced. The speech was more slurred, there was fibrillar trembling of the tongue, and the lips trembled slightly when he spoke. Pupils equal; acted well to

light. He complained much of stupidity in the head, and of inability to think or do continuous brain-work. He was certainly more feeble mentally, and his memory was very defective—so much so, that he forgot on one occasion that he had been at the hospital on the previous day.

In Ataxic paraplegia, the third variety of this group, besides sclerosis of the pyramidal tracts, there is degeneration of the posterior columns, and generally of the direct lateral cerebellar tract. In the posterior columns the sclerosis affects the postero-external column (c. of Burdach) to a varying extent in the sacral lumbar or lower dorsal regions, and extending from this there is degeneration of the columns of Goll. The distribution of the lesions marks the disease as a system disease. In addition to symptoms of lateral sclerosis, there is ataxy of movement from defect of co-ordination, due to the sclerosis of the ascending fibres from the posterior columns. The escape of the posterior root-zone accounts for the absence of sensory symptoms. In the progress of the disease the symptoms of lateral sclerosis tend to predominate, and the case may then closely resemble one of spastic paraplegia. The following case illustrates well the leading features of this variety.

The patient was a farm labourer of 35: he had had syphilis ten years ago, but no other illness, and had always been temperate. He complained of pain across the lower part of the back, and of weakness and stiffness in the legs. He could not stoop, and he felt that his legs trembled under him. There was loss of sexual power, and obstinate constipation; there was no urinary incontinence, but he was obliged to pass water immediately he felt that the bladder was full. The symptoms had come on

gradually during the last five years. He has had no bad pain throughout, nor any loss of feeling in the legs; at one time there was some tingling in the toes at night. He is giddy in the dark, and has fallen down on getting out of bed at night. He was a fat, pasty-faced man. His walk, unsteady, became decidedly ataxic if he closed his eyes. He could not stand steadily, and when he closed his eyes swayed to and fro and would have fallen. There was also, with closed eyes, some ataxy of movement in the arms. Pupils equal; act to light and accommodation; no myosis; optic discs normal. Speech normal. The muscles of the legs and thighs were weak and somewhat rigid: this rigidity was most marked in movements at the knee and ankle. The knee-jerks were very much exaggerated; there was ankle-clonus on the left, but none on the right side; front-tap contraction well marked. Plantar reflexes very brisk; cremasteric not obtained; upper abdominal present, lower doubtful. Sensation to touch, pain, and temperature, normal. No tenderness, deformity, or other abnormality about the spinal column.

The defect of co-ordination in walking, standing, and performing various actions constitutes the chief difference from primary lateral sclerosis; while the absence of sensory affections and the increased myotatic irritability, with more or less muscular rigidity, distinguish the disease from locomotor ataxy, more especially from those more rare cases of the latter in which loss of power in the legs comes on early.

To pass to the second group, in which lateral sclerosis is of secondary origin. In those cases of disseminated sclerosis in which the patches affect the lateral columns only, it is impossible to make an accurate diagnosis. Those instances, however, are rare in which, even if the

more common symptoms of disseminated sclerosis—*e.g.* characteristic tremor, nystagmus, scanning speech—are absent, there are not other signs, such as localized areas of anæsthesia, paralysis or atrophy limited to a particular group of muscles, or to those supplied by one nerve, to indicate that the morbid process is not confined to one system of fibres. If the distinction cannot be made at once, the lapse of a little time generally clears up the case by the appearance of fresh symptoms.

Next to these cases, the greatest difficulty in diagnosis from primary spastic paraplegia is presented by cases of "compression" paraplegia in which the fact of compression cannot be determined, and the pressure exercised on the cord is slight and gradually produced. Under such circumstances no sensory disturbance may be excited, and paresis, with excessive myotatic irritability, may be the only symptoms. Patches of transverse myelitis in the upper dorsal region may also be for some time confined to the lateral columns and be symmetrical in distribution, so as to bring about a descending lateral sclerosis without any affection of sensation and without focal symptoms; as in the last instance, a paralysis of the legs of spastic type will be produced. Tumours in the lower cervical and upper dorsal cord are said rarely to give rise to the same symptoms; and in one case, as mentioned above, syringomyelia was the lesion found at the autopsy. In the distinction of syringomyelia, Charcot relies on the presence of a peculiar disorder of sensibility; namely, tactile sensation is normally preserved, while sensation to heat and cold and to pain is lost. In the foregoing statement I do not of course mean to imply that in most cases of myelitis or compression paraplegia, where these diseases produce their ordinary

train of symptoms, there is any difficulty in the diagnosis from pure spastic paraplegia, but only that in certain cases the difficulty is a very real one. The following case illustrates the doubt there may be as to the exact diagnosis :

T.B., a coppersmith, æt. 31, comes of a healthy family, and had never had syphilis nor any bad illness, until in 1885 he was operated upon for a large growth in the left arm, which turned out to be a sarcoma. Following the operation, he suffered from abscesses of the elbow-joint and erysipelas, and was in bed altogether for four months. When he came to get about again he found that his legs were weak and stiff; and this weakness and stiffness has grown gradually worse, until now he can only walk with difficulty a short distance. Except for a dull aching pain in the back, he has been quite free from pain, and has had no loss of sensation. There has been a feeling of "heaviness" over the left leg, and the muscles twitch at night: the left leg was the first affected, and he feels the weakness most in the left knee. He suffers from constipation, but throughout has had complete control over the bladder and rectum. He has never had a girdle pain.

In walking the lower limbs are stiff and rigid, but when lying on the couch he moves his legs fairly well without ataxy. Except for the paraplegia, he is quite healthy. There is a slight lateral curvature of dorsal spine to the left, with curve to right in lumbar region: this he states has always existed. There is not the least prominence, pain, or tenderness over any of the vertebral spines. Sensation normal to pain, touch, and temperature, and equal on both sides on careful testing. The muscles are everywhere well nourished. The muscles of the legs

are weak, especially at the knee; there is marked rigidity of the "clasp-knife" kind. Knee-clonus is well marked; ankle-clonus could not be obtained in the ordinary way, on account of active contracture of the muscles; but whilst turning over on the bed he rested his weight for a moment on the toes of the right side, and this started most violent prolonged clonic contractions of the whole limb. Plantar reflexes brisk; cremasteric, lower abdominal, and gluteal, absent; epigastric present. Arms unaffected; special senses normal; no cranial nerve paralysis. Although the symptoms closely correspond to it, I do not think that we have here to do with primary spastic paralysis. The lateral curvature had always been present ever since the patient could remember, and had shown no increase of late years, and cannot therefore be held in any way accountable for the paraplegia. The rate of onset—distinct paralysis produced in four months—is very rapid for primary spastic paraplegia, and the absence of some of the superficial reflexes may be indicative of mischief in the lower dorsal and lumbar regions. The nature of the lesion remains uncertain: it is possibly a patch of myelitis, with secondary lateral sclerosis descending from it. The stationary character of the symptoms negatives the presence of a small tumour in the cord secondary to the sarcoma removed from the arm, unless this had for some reason ceased to grow. The patient's walking powers have improved decidedly under treatment by suspension: he considers that his legs are less stiff, and says that they do not "start" so much at night; but so far as I could ascertain, rigidity and increase of myotatic irritability remain about the same.

In the following case, the history given by the patient indicated that the lesion was most probably a limited

patch of myelitis, perhaps induced by the fall on the back two months before: the symptoms when he came under observation were those of spastic paraplegia, due to the lateral sclerosis which followed, and were more marked on the right side than on the left. The patient, a healthy-looking man of 49 years of age, was a sailor. He had always been strong and temperate, and had not had syphilis. He had a fall on the back twelve months ago, of which he thought nothing at the time; but two months later he had an attack of pain in the lumbar spine during the night, and since then has been losing strength in the legs, in the right more than in the left, so that he cannot stand or walk as he used to. He has had no pain or other affection of sensation; no girdle pain; no difficulty in micturition or defæcation.

On examination, he complained that the right leg felt cold; but no objective difference could be made out in this respect between the two limbs, and sensation of all kinds was normal over both sides. He walked feebly, dragging the right leg, and, after walking a little time, scraped the toes along the ground. The muscles of the legs were rigid, especially on the right side: they were well nourished, but weak. Ankle-clonus was easily obtained; the knee-jerks exaggerated, the right most so, and plantar reflex was more brisk on this side. Except the right cremasteric, which was absent, the other superficial reflexes were normal. No loss of muscular sense; electrical reactions normal; arms unaffected; no abnormality detected in spinal column, and no pain nor tenderness in any spot.

There are two chief "functional" conditions in which the symptoms resemble those of spastic paraplegia, but in which there is probably no structural change in the

cord,—at any rate, sufficiently coarse to be recognisable by the microscope.

The cases which bear the closest resemblance to lateral sclerosis are those to which Dr. Hughes Bennett gave the name of "hypertonic paralysis."* They are characterised by motor weakness, with excessive myotatic irritability, but without rigidity. Every degree of increased muscular irritability to percussion on the mass of the muscles themselves or on their tendons may be present. Although the condition is a general one, and the whole muscular system is affected, weakness of the lower extremities often predominates. The chief symptom complained of by the patient is then a gradually increasing weakness in the legs, first shown by the readiness with which fatigue is induced after slight exertion. There is no affection of sensation, nor of the special senses, nor of the bladder or rectum; the muscles do not atrophy, but in protracted cases the affected limbs may become smaller from disuse. The weakness may come on after prolonged severe exertion: it may quickly pass away again, may last a considerable time with gradual improvement, or may remain stationary. I do not think that these cases can be separated from the very similar condition of weakness with excessive muscular irritability to mechanical stimulation which is met with in wasting diseases such as phthisis, or in convalescence from the acute fevers, except that in the latter the muscular wasting from malnutrition is more marked. In rheumatoid arthritis a similar condition of the muscular system obtains in its most extreme form, with a very much greater degree of wasting. The electrical reactions are normal or show slight increase to both currents.

* Brain, January, 1888.

Clinically, the cases of which Dr. Bennett wrote are distinguished by the occurrence of this "hypertonic paralysis," without as a rule obvious exciting cause and unattended generally by wasting of the muscles, although these may be small and flabby. The following case illustrates the typical features of this affection, and it is needless to quote the details of other cases of which I have notes. My patients have been chiefly men, in early adult life; as a rule there is not an obvious exciting cause, but the patients were generally engaged in some exhausting and laborious occupation, carried physical exercises to an extreme degree, or gave way to excesses of various kinds:

W. S., æt. 18, a blacksmith, of healthy family, had had no previous illness until twelve weeks previously, when he had a bad cold. He remained at work, feeling weak, until fourteen days before he came to me (in March, 1889); on this day his legs seemed to give way under him whilst he was at work—he fell down, and was unable to walk home: at the same time he had a pain in the right knee. Since then he has been unable to stand or walk for long at a time. For some weeks before the fall he had felt a gradually increasing weakness in the legs. He had not had any pain, nor other sensory disturbance. On examination he appeared healthy, except that he was rather anæmic; the thoracic and abdominal organs were sound. The muscles were weak and rather flabby, but showed no wasting nor rigidity; movements were weak, but normally performed; his gait shuffling and rather unsteady. Knee-jerks much exaggerated; ankle-clonus on both sides—most on right. The tendon reflexes in the arms also showed marked increase, and the muscles generally gave an exaggerated response on percussing them. Plantar reflexes absent; other superficial reflexes normal. On examining eyes fundus

and optic discs healthy. $V=\frac{20}{30}$. He was kept at rest on full diet, and given a ferruginous mixture containing arsenic and belladonna; and made a good recovery in about eight weeks, at the end of which time ankle-clonus could no longer be obtained, while the knee-jerks were still somewhat exaggerated, but subsequently gradually became normal.

These cases of "hypertonic paralysis" resemble mild cases of spastic paralysis, in an early period of the disease, but differ from it in the absence of muscular rigidity, and in the increase of myotatic irritability affecting the muscular system generally, arms as well as legs; Ankle-clonus may be pronounced; in two instances I found that it was absent so long as the patient remained in bed, but if he were allowed to get up and walk about the room a little, it could be elicited in the most marked way. This very distinct increase of clonus on exertion may be found useful in the diagnosis from spastic paraplegia, in which the same degree of difference is not found. Dr. Bennett lays stress on the frequent absence of the plantar reflex, as in cases of hysterical paraplegia. He states that, so far as is at present known, these cases either recover or remain in a stationary condition, and do not go on to spastic paraplegia with lateral sclerosis. I have given above, however,—and others are on record,—a case in which spastic paraplegia distinctly came on after enteric fever, though it took five years in developing to complete paralysis; and as this increased muscular tone or irritability with motor weakness is a common sequela of acute fevers, it would seem *a priori* probable that some cases do not entirely recover, but eventually pass by slow intermediate stages into well-defined lateral sclerosis. Lastly: cases of so-called hysterical paraplegia may

present rigidity of leg-muscles, with increase of myotatic irritability, without any affection of sensation. Aid in diagnosis may be obtained from the general bearing of the patient, the account of the present illness and of its cause, while the history may disclose previous attacks of recognized hysterical affections. Other symptoms, such as marked ovarian hyperæsthesia, may be present. Of the local signs, whilst the knee-jerk may be exaggerated and there may be ankle-clonus, this latter is always slight and badly marked, and never present in the extreme degree common to spastic paraplegia. The plantar reflex, as Buzzard points out, is generally absent, while the other superficial reflexes are natural. Tapping the patellar tendon may evoke a nervous start or a display of nervous excitement; rigidity is present in all positions of the limb, and the resistance to passive movement may be felt to vary from time to time. A contracture of the great toes in the position of extension is a not uncommon characteristic.

Clinical Records.

SOME CASES OF PERIPHERAL NEURITIS.

By D. R. PATERSON, M.D. (Edin.), M.R.C.P. (Lond.), Cardiff.

ALTHOUGH the great Irish physician, Graves, was many years ago conversant with the fact that paralysis might arise from an affection of the "nervous extremities alone," it is only within recent times that the observations of Leyden, Grainger Stewart, and others have placed it upon an established basis. The clinical picture of peripheral or multiple neuritis is, indeed, now so well known, that its recognition presents but little difficulty; and our knowledge of the conditions under which we may expect to find it is ever increasing. Several points of interest, however, connected with the disorder are still *sub judice*, and call for settlement; and as I have had opportunities of studying several examples lately, I may be permitted, in illustration, to detail some of the clinical histories, condensed from notes which I have made. I have to acknowledge my indebtedness to Dr. Sheen, under whose care, at the Cardiff Union Hospital, most of the patients were.

CASE I.—*Multiple Neuritis affecting arms and legs—Phthisis.*—K. R., 23, a single woman of loose character, was admitted April 11th, 1890, complaining of "rheumatism." She stated she had been in the hospital for

six weeks at the end of last year, on account of pain in the feet and inability to walk properly. She improved considerably, and got about so well as to take her discharge before Christmas. She resumed her drinking habits, and in a month was laid up with the old symptoms, being obliged to stay in bed, as she was unable to stand. A month before admission the fingers began to feel dead, with pain shooting down into them and the wrists, and weakness and difficulty of grasping anything appeared. She had suffered from cough for some time, certainly before last Christmas, but had no expectoration until a few weeks before admission; and latterly she had been losing flesh rapidly. For the last three years she had drunk heavily, chiefly spirits. There was no definite history of syphilis. *On admission* the patient showed signs of emaciation. There was decided weakness of the hands, both in the movement of the fingers and grasping power. The movements were slow and clumsy, the patient being able to pick up a pin imperfectly, and the grasp of the right hand was stronger than that of the left. Sensation was impaired in the fingers and backs of both hands; but in some places, *e.g.* the palms, there was hyperæsthesia. In the lower extremities, the patient had pain in the thighs and calves, very severe on moving the limbs, and great tenderness on grasping the muscles. There was much wasting. The extent to which she could lift both legs from the bed was small, and the power of dorsal-flexion in the ankle feeble, the toes being "pointed." She was unable to stand without support; the plantar reflex was lively, but both knee-jerks absent. Sensibility was impaired, more especially over the calves, while above the knees the hyperæsthesia was so great that mere stroking caused great agony. The

sensory disturbances went up as far as Poupart's ligament. There was full control over rectum and bladder. Frequently, palpitation on exertion troubled her. She was suffering from diarrhœa; the cough was troublesome, and the expectoration, although scanty, muco-purulent. There was impaired resonance at the right apex, with cavernous breathing; increased vocal fremitus and vocal resonance, and crepitation. At the left apex the signs were not advanced. The temperature ranged between 100° and 103°, and night-sweats were frequent. On May 9th, dulness had become more marked at the right apex; and patient was still in bed, on account of the great tenderness in the thighs and the continuance of diarrhœa. By June 4th there was, on the whole, less pain, but a good deal of tenderness in calves and thighs; wasting becoming more prominent and power of movement less, the legs being extended and the toes pointed. Sensation altered in the upper limbs as far as the middle of the upper arm. Left apex more affected. On the 10th there was a severe exacerbation of the pains, ascribed to the wet weather; and sensation below the knee was now quite gone. Diarrhœa was checked after bismuth and hydrocyanic acid mixture. A month later (July 7th) pain was considerable, "burning like a coal," from the toes to the hips. The arms had been free from pain for some time. Urine contained a trace of albumen. Death took place three days after; and at the autopsy a cavity as large as a Tangerine orange was found in the right upper lobe, with irregular walls and much consolidation around. The left upper lobe was solid, and scattered foci were seen throughout the entire lung. No naked eye changes were observed in several of the peripheral nerves removed for microscopic examination.

CASE II.—*Acute Phthisis—Peripheral Neuritis affecting the legs.*—S. H., 22, who had "drunk hard during last five years," was admitted on December 30th, 1889, with acute lung disease of three weeks' standing. It had begun with shivering; and she continued to go about drinking until the week before admission, when she took to bed. On admission there was consolidation at the left apex, and moist sounds; while behind and below there were loud râles. The temperature was 102°; and the sputum was muco-purulent, with numerous tubercle bacilli. On January 4th the patient first complained of "burning, aching pain" just above the knees, sometimes extending down to the feet and up to the hips. By the 6th the symptoms of peripheral neuritis were pronounced. It was painful to move the limbs, and she was unable to stand. The legs felt "dead;" and whilst tactile sensation was retained, the sensibility to pain was much blunted from Poupart's ligament down. Both plantar reflexes and knee-jerks were absent, and the calves and thighs tender to touch. On the 15th she was unable to turn in bed. By the 18th the pain had lessened, the limbs lay extended, toes pointed and feet everted, with the power of extension and flexion in the ankle slight, and the movements of the knee feeble. There was dulness over the whole upper lobe of the left lung, bronchial breathing, increased vocal resonance and crepitation; while over the lower half, and the upper half of the right, there was crepitation without impaired resonance. All other organs were healthy, the urine normal, and the temperature 102°. Later on, while pain disappeared and the leg-muscles became much wasted, a cavity formed in the middle of the left lung, night-sweats and diarrhœa became more continuous, and death ensued on February 6th;

the temperature having ranged in the course of the illness between 100° and 103°. On *post mortem* examination, the left lung was found solid with tuberculous matter, and a small cavity in the upper lobe; extreme apex of right lung also involved. The sciatic and peroneal nerves of both legs were swollen and injected, the left being more so.

Here the neuritis began while the patient was under observation, and a week after all alcohol was stopped. It will be observed that it was limited to the lower limbs.

CASE III.—*Phthisis—Neuritis affecting legs and arms—Mental Symptoms.*—E. S., aged 36, a married woman; admitted September 11th. She had drunk heavily for a long time, and within recent years was on several occasions in hospital suffering from the effects of drink. She complained of cough and weakness for about a year, and five months before admission had severe hæmoptysis. Three months after, stiffness and pain in the legs appeared; in two or three weeks she was obliged to sit down from the difficulty of walking and pain in the soles, ankles and legs generally, and within a month from the commencement was unable to walk. Shortly after the involvement of the legs, she experienced loss of power and numbness in the hands, and this condition increased. Besides expectorating much muco-purulent sputa, and showing signs of extensive affection of the left lung, the patient presented the appearances of peripheral neuritis in an advanced stage, and very similar to those described in Case I. On October 28th, a few days before death, there was little alteration in the legs. But she had delusions about her surroundings: she did not know how long she had been in hospital, and forgot when she saw her friends last. She was not noisy, and she slept well during the daytime. These continued up to the end.

CASE IV.—*Phthisis—Neuritis of legs.*—E. T., 35, a charwoman of dissipated habits. Early in this year she had been in hospital with an injury to the knee-joint, and went out well before Whitsuntide. She continued in good health for two months, although she lay out at nights and drank hard of spirits, rum, etc. Cough, however, came on, and hæmoptysis, and shortly before admission—at the end of August—she began to have severe pains in the legs, and soon lost the power of walking. On examination, there a moderate degree of paralysis of the legs with altered sensation, tenderness of the muscles and absence of knee-jerks. In the right hand, a feeling of formication. The right lung was largely affected, cavernous respiration could be heard, and the sputum was copious and muco-purulent. The state of the limbs improved after admission, but the pulmonary disease advanced, and the patient died in November.

CASE V.—*Phthisis—Multiple Neuritis—Mental Symptoms.*—A lady of 28, five years married, but childless, came under the care of a medical man in this town in October, 1889, when a phthisical cavity at the left apex was recognised. Under treatment the general condition was improving, when a little before Christmas the patient began to complain of curious sensations, pain in walking and tenderness of the legs as far as the hips. She was unable to sleep on account of cramps, and was obliged to lay up. Pain became more severe and burning, patches of anæsthesia appeared on the sole and heel, and the hyperæsthesia of the legs and knees increased, so that the patient dreaded anything touching her. Soon after tingling of the finger-tips set in, followed by pain and loss of power, rendering it impossible for her to feed herself or hold a glass. The leg-muscles wasted, the toes became

pointed, although the temperature at this time was little above normal. Later on, muscular twitchings in the face, arms, and legs were observed, and lasted a few days; after which there was a partial convulsion, which left for some days an external squint and double vision. Mental symptoms, such as hallucinations and delusions, with mumbling speech, were likewise present. After some days the patient improved mentally, and regained some power over the legs; but the whole body remained hyperæsthetic. She died about three months after the onset of the neuritis, the lung symptoms never being very prominent. There was a suspicion of alcohol, which, however, was always denied, until the patient became quite bedridden and mental symptoms appeared, when the friends admitted that she was in the habit of consuming considerable quantities of wines and spirits daily. The improvement followed its restriction.

In these cases we have a striking example of the fact that the female sex is especially liable to alcoholic neuritis, and further an illustration of the association of that disease with tuberculosis. We observe that the patient in each instance was affected with phthisis; and, with the doubtful exception of the last (Case V.), death was to be attributed to that cause. In the discussion on chronic alcoholism at the Pathological Society two years ago, Dr. Payne called attention to the "undoubted frequency of tubercular disease in the subjects of alcoholic paralysis"; and Dr. Sharkey threw out the suggestion that a suitable soil for tubercle might result from a neuritis of branches of the vagus or other nerve going to the lungs. Such an explanation may serve in some instances, and I can recall the case of a seaman, aged 43, suffering from phthisis, whose latter days were

rendered miserable by frequent attacks of distressing palpitation, and in whom, after death, besides extensive infiltration of both lungs, the vagi were found surrounded by tuberculous glands, being softer, redder, and more flattened than usual. Even here it seems probable that the changes in the nerve were secondary. However that may be, it is to be noticed that in the cases I have recorded above, the tuberculous process was first upon the scene. In each patient symptoms or signs of phthisis had shown themselves some time before the nerve affection, and it is difficult to look upon the former as a complication of the latter, or caused by it. On the contrary, these cases suggest tubercle as the chief factor, and such a form of neuritis has indeed been described by Pitres and Vaillard; but in nearly all the cases they record there is a history of alcohol as well. The part played by alcohol was well exemplified in Case I. Whilst it is probable that phthisis as well as neuritis was present on the patient's first admission, the latter rapidly improved as soon as all stimulants were cut off, only to reappear, however, in a more aggravated form when she returned to her old habits. Dr. Pitt, at the Pathological Society meeting, gave some striking statistics of the association of alcoholism and tubercle. In 1883, of eight cases of cirrhosis of the liver observed in the *post mortem* room at Guy's, acute tuberculous disease was found in six, and fibroid phthisis in one of the other two. This, he says, is probably exceptional. But frequently the pulmonary symptoms have not been prominent, and therefore may be overlooked. In all the patients under 40 who had cirrhosis, out of thirty-three two-thirds had tubercle in the lungs or elsewhere. To state the matter generally, we may say that the causal relation of tuberculosis and

alcoholism, is to be explained on the principle that drink, with the conditions too often attendant upon it, impairs the general vitality and renders the individual, with his enfeebled energy, but little able to resist the onset of disease. These two processes intimately react upon each other, the order in which they appear being probably determined by circumstances peculiar to the individual. Moreover, we have often to reckon with the possibility of syphilitic infection; and here I may allude to a point lately raised, as it furnishes a good example of the difficulty of determining the ætiological factor. Cases of syphilitic neuritis have been repeatedly described; but in many of them we cannot altogether exclude the effects of alcohol; nor, what is of more importance, ought we to lose sight of the influence of the mercury used in treatment. It is well known that most of the heavy metals act as powerful nerve poisons, and two at least—lead and, less frequently, arsenic—are recognised causes of polyneuritis. In the old days of water-gilding, the picture of tremor and other nerve disturbance dependent on mercurial vapour was not uncommon; and it seems feasible that a prolonged course of inunction may at length affect the patient's nerves and illustrate what Lord Palmerston said regarding gout, about the remedy being worse than the disease. Accordingly, the question coming up for decision would be, as happened in an instance quoted by Oppenheim, Does the neuritis depend upon the syphilitic poison or arise from the mercurial treatment? The importance of this is apparent, and was amply shown by Oppenheim's experience; since, on discontinuing the energetic mercurial treatment under which the disease progressed, and substituting baths, massage, etc., the best possible results were obtained. Syphilis and alcohol are

frequently companions, and it is often impossible to assign their priority in causation. Thus, to quote an allied case, I saw not long ago a well-marked example of Charcot's amyotrophic lateral sclerosis in a man who, whilst admitting that he had syphilis thirty years before, attributed his illness to six months' hard drinking. But it is open to question whether either had any influence; at all events, treatment met with no success. Quite recently Dr. Buzzard published some observations which go to show that the action of alcohol may be circumscribed, and he quotes an instance of its limitation to a single muscle—the extensor communis digitorum. I do not know how far the writer was able to exclude local causes; but some limited paralyses in drunkards, we are still justified in grouping amongst those regarded by Duchenne as "paralysis from cold." I have notes of the case of a labourer, aged 51, who, whilst working last winter through a sleety night shovelling coal, experienced towards morning some stiffness in the right forearm, and on warming it at the fire, felt it "go quite dead." The hand became powerless; and when I saw him, two weeks after the onset, there was pronounced "drop-wrist," paralysis, and wasting of the muscles supplied by the musculo-spiral nerve, and impaired sensation in its cutaneous area, with numbness and a feeling of "pins and needles." No traces of lead were present; but the patient admitted being a drinker. Recovery was complete in ten weeks.

Turning now from this part of the subject, I should like to refer briefly to a problem which is at present engaging discussion. I allude to the association of abnormal mental states with this disease. In Cases III. and V. mental symptoms appeared at a late stage, and may

possibly have little significance; but where the mind is early impaired, they form such a prominent feature, that the neuritis may be lost sight of altogether, or mistaken for another affection. The following history illustrates this:

CASE VI.—*Peripheral Neuritis—Mental Symptoms.*—C. B., aged 22, admitted 23rd April, 1889, with certificate that she was suffering from locomotor ataxy. No history could be got from her friends, beyond that she had been "very bad" for some weeks, and previous to that had been drinking heavily. She lay on her side and scarcely moved. Her mind was a perfect blank. She was unable to give any account of herself; did not know where she was, or how long she had been in the hospital; and when asked anything, stared stupidly, and said "I forget," or "I don't know." There was inability to stand, the leg movements were very feeble, the power of dorsal-flexing the ankle gone, the muscles wasted, and both calves and the left thigh tender. Sensibility below the knee was lost. The arms were weak, the grasp feeble, and both biceps muscles tender; but sensation was good. The knee-jerks were absent; the pupils reacted to light and accommodation; and the tongue was tremulous. After admission, she began to improve under massage and baths: intelligence returned; the face regained expression; and she was able to walk with only slight hesitation on her discharge three months later. She could not recall, during her stay, anything of the early part of her illness; memory, however, was slowly becoming better before she left.

Here the symptoms were sufficiently marked to give some colour to a suspicion that we had to deal with a case of mental disease. The hebetude, expressionless

face, and complete loss of memory, suggested an illness of longer duration than was indicated by the meagre history; but those doubts were quickly dispelled by the patient's rapid progress, and we were convinced of the truth of the opinion hazarded on the patient's admission by one of her friends, that it was "nothing but the drink." The psychical disturbances as they accompany neuritis have been fully studied in recent times by Korsakow, who has pointed out their relation to alcoholism, and proposes to separate them into a special group. Be that as it may, the practical point urged by Oppenheim is, that such a condition may be mistaken—and this actually occurred in the case he quotes, as well as in my own—for tabes with mental symptoms, wherein, of course, the prognosis is altogether different.

Among the acute infectious diseases in which peripheral neuritis may be met with is enteric fever. The subjoined case is of some interest.

CASE VII.—*Enteric Fever—Peripheral Neuritis affecting legs.*—H. M., 31, a German sailor, was admitted April 21st, 1890, with enteric fever in the third week, and severe pulmonary congestion. On the following day there was a small intestinal hæmorrhage. The temperature became normal on the 28th; this was followed by a slight relapse, the temperature again reaching 98.4° on May 7th. Next day the patient complained of pain in both legs, and the temperature rose to 100.6°. On the 9th he was much distressed at the state of his legs. They lay extended, with the feet inclined outwards, there being inability to use them beyond slight flexion of the knees and ankles and feeble movement of the toes. The calves were very tender to the touch, and movement of the ankles caused pain in them. Sensation was good, the

plantar reflexes intact, and the joints normal. The arms, patient said, felt weaker; the grasp was feeble, there was pain in the flexor muscles, and pressure on the ulnar nerve showed tenderness. On the 12th, after massage, the legs could be moved better, and the tenderness was less. By the 20th power was being regained rapidly. He was discharged on the 28th, at his own request, with some weakness remaining in the peronei.

The sudden onset of loss of power in the legs, and the absence of sensory disturbance, resemble the palsy occasionally seen after diphtheria. I do not know that the nerves of the upper limbs could be said to be the seat of neuritis: the patient attributed the weakness of his arms to the extra work thrown upon them in consequence of the state of the legs,—movements such as turning, sitting up, &c., necessitating much assistance from the use of the hands,—and it is likewise probable that the tenderness of the ulnar nerve did not denote more than is usually met with in convalescence from acute disease. In pneumonia, during convalescence, I have observed, in two instances, similar symptoms confined to the leg, though not so pronounced. Paresis and muscular tenderness were made out, but sensation was intact.

Health-Resorts in the West of England and South Wales.

IV.

ILFRACOMBE.

BY

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FOR the last fifteen years North Devon has been gaining in popularity as a health-resort, and the number of people who are recommended there in search of health increases year by year, not only in summer, but in winter-tide also. Since the two direct lines of railway—the Great Western and London and South Western—by their accelerated train service have made Ilfracombe so accessible from London, this is the point which most visitors select as their head-quarters when visiting North Devon. Ilfracombe so little resembles other watering-places both in its position and surroundings, that an adequate description is a somewhat difficult task, and it requires to be visited by those who would fully realise how unlike it is to almost all other coast towns.

It is most picturesquely situated on the southern shore of the Severn Sea. From the North Foreland to Morte Point extends a grand coast-line of steep cliffs, fronted by jagged rocks, broken only by "mouths," as Lynmouth, Heddonsmouth, Watermouth, Wildersmouth, and some two or three

other "mouths," through which the streamlets collected in the grassy Combes have broken the barrier and leaped into the sea. The Combe along which the Wilder stream finds its way is known as Ilfracombe; or, as it indifferently seems to have been spelled, Ilfordscombe, Alfredscombe, or Ilfarcombe. The land-surface is either depressed by four deep valleys—Lee, Slade, Score, and Chambercombe—or so undulated that not a single acre is level enough for a cricket ground; and even the railway terminus is of necessity perched on the spur of a hill, standing abruptly some 200 feet above the level of the streets. The coast-line is fine; and outstanding prominently, Helesborough, the Lantern Hill, Capstone, and the seven peaked "Torrs," form the most lovely walks, and perhaps the best marine promenade in the kingdom. These walks are zigzagged on the face of the hills, and lead by a succession of easy gradients to the summit, whence a glorious view of sea and land may be seen. The greatest want perhaps is in the partial absence of a sand beach: but that want is compensated for in more ways than one; and the children must substitute pebbles for sand in their toy-spades, though the wish for the softest sand can be gratified by a visit to Woollacombe, where there is a clear sandy beach, without let or hindrance. Nowhere are there found such lovely rock terraces, such charming secluded coves, such pretty bathing-places, such beautiful lanes ramifying southward and eastward, down which to catch on each retrospect "the many-twinkling smile of ocean," as at Ilfracombe. Fashion and custom fix the season for August and September, though the mildness of the climate wins not infrequent winter visitors—health seekers longing for pure air, or to escape the severity of the weather in the East and North. But perhaps, of all

seasons, early summertide is the most inviting, when the orchards are pink with apple-blossom, the trees and hedgerows are decked in their freshest livery of green, when the tall grass waves gracefully by the goldcups, and thousands of silvery daisies glitter beside the blue speedwells, while the scented honeysuckle and briar-roses are unfolding, and the blue sky overhead is flecked with breezy cloudlets. Autumn also is a pleasant time; it is genial on these western shores, and narrows the limits of winter's icy reign. But here winter can hardly be called icy; there seldom average more than five frosts in the twelve months, some years escaping them altogether, and our meadows are green and our wild flowers blossom in succession all the year round.

Local Productions.—The High Street is the business part of the town; the shops are good and supply every necessary want, while to the lovers of lace and china a walk through that same High Street will prove very delightful. The markets are large, moderate, and well supplied. Three local productions are important to the invalid: clotted cream, a pleasant substitute for cod-liver oil; four-year-old Exmoor mutton, which is almost as well-flavoured as venison; and laver *(Porphyra vulgaris* and *Porphyra lancinata)*, a sea-weed which grows on the rocks at low-water mark. It is prepared by the country people for market by being washed in running water for a long time, and then gently simmered over a slow fire for hours together. It is served very hot, mixed with vinegar or Worcester sauce and butter. It contains a small proportion of iodine and bromine, which renders it a most useful adjunct to diet in cases where alterative treatment is desirable.

Milk is abundant and rich. In the season, game and

rabbits are plentiful. Black game from Exmoor is occasionally for sale. Fish is abundant, being procured from both the North and South Devon coast, as well as landed by steam trawlers directly from the new fishing grounds north west of Lundy.

There are excellent fishing stations within easy reach of Ilfracombe, for those who like to kill their own dish of trout; and even a salmon is no unusual prize in the Taw or Torridge.

The whole of the local ferns, in which this district is unusually rich, and many others, may be purchased in the market.

Improvements.—Artificial means have been used to enhance the beauties which Nature has so lavishly bestowed. A fine Parade has been made round the Capstone: the Victoria Promenade, or the "Shelter," as it is more frequently called, has proved beneficial; for, being situated at the south foot of the Capstone Hill, it is especially suited for a winter walk. It is a building of iron and glass, with the flooring of encaustic tiles, and seated throughout: it is planted with creepers and ornamental shrubs; with a band-stand, where a band plays in severe weather. On cold sunny days the inside of the Shelter enjoys the genial warmth of summer; and invalids can drive there in the useful donkey-chairs, which will put them down close to the entrance, so that they can get in and out without any difficulty, and can sit inside listening to the band, enjoying the warmth and greenery, without fear of taking cold. Admission is free.

Sanitation.—The town is drained by extensive public sewers, with which all the houses are connected. These sewers consist of Annerly glazed pipes, are well ventilated, both at their dead ends and along their course, by lofty air

shafts. They have two outfalls, extended by iron pipes into the tideway, where the deep, strong current, running four knots an hour and rising 35 feet in this Channel, soon sweeps all sewerage matter out of sight. The town- and house-refuse is daily collected, all organic matters being separated and burnt.

Water-supply.—The water-supply is constant, and under high pressure, coming partly from deep springs, and partly from an undulating collecting area lying above and on both sides of the Slade Valley. The watershed is pierced by the great railway-cutting. The collected water is stored in two deep reservoirs; it is then passed on to five beds, where it is filtered through sand and gravel from the Spratt Ridge in the river Taw. It is a soft and excellent water for all domestic purposes.

The following analysis of Ilfracombe water may interest some of our readers:

	Grains per Imperial Gallon
Sulphate of Lime	1.522
Sulphate of Magnesia...	.385
Nitrate of Magnesia	.712
Chloride of Magnesia	.918
Chloride of Sodium	3.391
Soluble Silica	.050
Oxides of Iron and Alumina	.070
Oxidisable Organic Matter	.179
Total Solids ... ... Grains	7.227
Total Hardness	4¼ degrees.
Permanent Hardness	4 degrees.

Death-rate.—With such advantages it is not to be wondered at that Ilfracombe is healthy, and its death-rate so low, seldom exceeding 15 per 1000. A large percentage of the population attain the age of 60 years and

upwards; and no less than eight inhabitants, during the past half-century, have reached the patriarchal age of 100.

Vital Statistics.—The following are the *crude* death- and birth-rates for the last two years:

	1888.	1889.
A Mortality of Residents and Visitors of	14.3 ...	14.5
A Birth-rate of	25.5 ...	25.3
An Infant Mortality per 1000 born of ...	99.3 ...	89.4
A Zymotic Mortality	.0 ...	.7

These death-rates are without doubt greater than the true death-rates, which in towns of small size, subject to a large periodical influx of strangers, are of very difficult calculation.*

Ilfracombe is well equipped with an Infectious Diseases Hospital, a Mortuary, a Hospital for Accidental Cases, Fire Brigade, and Life Boat; and can claim to be one of the very few towns which the Government Inspector declared, on his visit during the last cholera scare, to be entirely free from sanitary defects.

Climate.—With regard to climate, it may be summarised as essentially oceanic, and, compared with many health-resorts throughout the kingdom, occupies one of the first places in regard to mildness. It is conspicuous for the absence of those extremes so prejudicial to health, especially to invalids. The summers are comparatively cool—thunder and lightning being of rare occurrence. The air during this period is remarkable for frequent agitation: generally bracing, without being keen; fresh, without pungency. Some people object to

* Ilfracombe is a U.S. district co-extensive with the Parish. It covers an area of 5,358 acres; and contains a population of between seven and eight thousand.

On a given week in August the number of strangers sleeping in the town reached nearly 9,000.

Ilfracombe, saying it is often too windy to be exactly pleasant; but these brisk movements of the atmosphere are of the utmost value to the invalid, affording in the hottest days opportunity for restoring the exhausted tone of the system; and these over-fastidious objectors must remember that health must be first considered. The winters are mild and equable, snow seldom falling,—and if it does, never lying on the ground,—and railway and telegraphic communication but seldom interrupted. It is owing to the Gulf Stream that our Ilfracombe winters are so very unlike the same period of the year in an eastern county. The air of an eastern winter irritates the invalid's chest; but here in the west it is "breathing made easy," for the soft air, loaded with sea-moisture, soothes while it penetrates the lungs. Tubercle may remain quiescent for years if all causes of irritation are avoided; and of these none is so common or so unavoidable as the sudden contact of cold, raw air. Then, why has Ilfracombe such a reputation as a sanatorium for those suffering from disease of the kidneys, from gout, from disorders of the liver and stomach? It is in a great degree because the climate induces, by its equality and softness, a regular action of the skin and the various mucous surfaces. Another important fact which must be mentioned is the dryness of the soil: the roads may at times be rough, but they are never muddy in the true sense of the word. The winding lanes, so beautiful with ferns and wild flowers, and the delicious home walks, so special an enjoyment at Ilfracombe, are free from this great drawback to country pleasures. Rarely is it necessary for the most delicate to be homebound: to be detained indoors from wet underfoot is almost unknown, as the surface of the soil on the cessation of rain at once becomes dry.

Progress.—Comparatively few years ago Ilfracombe was but a small village, known to few, and visited by still fewer. During the past fifteen years it has made rapid progress, and the last two or three years have so increased its size that our once distant parish church has nearly become the centre of the town, and the wild Torrs are on their land side studded with modern villas, and their bold sea-fronts are carved with pathways easy of access to adventurous donkey-chairs. How is it there has been such rapid progress? Ilfracombe boasts of no trade or manufacture; the people are employed in agriculture, coasting and fishing, in retail trade, or lodging-house keeping.* But one thing it has which has brought it into repute, and that is the giving of health. It is for that reason it has become so noted. At a disadvantage when compared with many watering-places which are situated near large centres of industry, on account of its isolation, still it holds its own with Llandudno, Rhyl, Southport, and Blackpool (places so dear to the dwellers in the Black Country), as the number of summer visitors proves; and the steady increase of winter trade shows that as a health-resort it is becoming worthily famous. Here we breathe only the purest air. If, on the one hand, it is a disadvantage to be far away from our big manufacturing cities, on the other hand it has its important advantages. Turning from the fresh sea-breezes, and getting away from the town, we have the sweet, bracing air which blows on us from hill and fell, from miles of open country stretching far away on all sides, filling our lungs with the needful oxygen, and

* The old saying "Everyone to his trade" certainly stands good of Ilfracombe. Lodging-letting is the trade, and is most excellently provided for; and if strangers will only avoid August, there is no English town where life may be lived in lodgings so well and so moderately as in 'Combe.

giving to our weary frames new health and life. Moreover, Ilfracombe and the adjacent country possess sufficient character and sufficient originality—if we may so use the word—of atmosphere and scenery, as to render a resort to North Devon, next to special continental travel, the most desirable thing in the world for the seeker of direct change. This change is now gained over a direct route, suited for the most delicate sufferer, by a journey which will cause the slightest possible amount of fatigue, and the length of which, if necessary, can be agreeably broken. Thus, we cannot wonder that, possessing such splendid scenery, such advantages of soil and situation, Ilfracombe should have made such advances, and from being merely a creek, sheltering pilots and channel coasters, and largely suspected of smuggling, it has now justly become so favourite a resort.

Dress.—The conventional rules which govern dress are here greatly relaxed; and provided the toilette is graceful and easy, its fashion will scarcely bar the visitor from mixing at any hour with the gay throngs that crowd the Shelter, promenade on the Capstone, gaze on the players in the public tennis-courts, or sit in thick rows on the rocks to watch the doings of the wonderful and unrivalled "Punch," who, from being a mere bird of passage, has been tempted to make Ilfracombe his permanent home. Here grave citizens, who pursue their daily avocations in black frock-coats and high hats, rush recklessly into straws, many-coloured caps, striped flannel jackets of brilliant hue—locally known as "Blazers,"—demonstrating how much the pleasure of seaside life is enhanced by the near approach to the freedom and conditions of uncivilised society.

In conclusion, it may be affirmed that the clear,

mild climate of Ilfracombe, the well-established reputation of which has of late been submitted to such severe scrutiny, is suited for the most delicate invalid, and has rather increased than diminished in celebrity, for its curative agencies rest on a reasonable and satisfactory hypothesis. Still, it is no panacea for disease, and, like other permanent remedies, it is slow and gradual in its action on the human frame. True it is that persons remove here after partial recovery from acute illness, and find often that the action of the air is rapid in hastening convalescence; but in more chronic cases the invalid must be warned against impatience, remembering the gradual inroad of disease, the slow departure from the normal limits of health, and feel sure, however favourable may be the result, still that a few short weeks cannot in reason suffice for retracing the uphill pathway of health. The health-seeker, however, may be assured that, leaving the result with the Almighty Disposer of events, he adopts in selecting Ilfracombe as a sanatorium a most effectual means for the restoration of his debilitated frame. The vast increase of our urban populations, and the necessarily artificial lives they live, render their yearly outing a necessity as well as a pleasure; and a better playground than the Ilfracombe district it would be hard to find. The air, so breezy and free from organic matters; the genial yet tonic climate, and the dry soil, which permits of the maximum of out-door exercise; the equality of temperature; the absence of thunder and lightning, which are so disastrous to sufferers from epileptic fits; the sparseness of population; the very small proportion of old houses, old courts, and old streets; the lofty and eye-striking frontage which forms the seaboard of the town; the vast expanse of open and almost uninhabited country which

extends for miles inland, rising with gentle gradients to an altitude of over a thousand feet, a grassy land broken by rounded hilltops, torrs, and combes, and accessible in all parts by lanes and field-paths; the view seaward, where the eye watches with changeful interest the vast trade of the Bristol Channel passing and repassing, thus avoiding the depressing monotony of sameness; the perfect drainage; the abundance and purity of the water; the ease and amplitude of sea and land excursions, which reach Clovelly, Lynton, Bideford, Exmoor, and Dartmoor; the simple pleasures and early hours which fashion the lives of most of the visitors to 'Combe, may not, indeed, be sufficient inducement to allure the devotees of fashion or the frivolous idler, but are all-important to the genuine seeker of health, who will here recognise a glorious temple where Nature needs no priest of Æsculapius to interpret her ritual, but, face to face with her votaries, freely bestows large gifts of health and healing.

Reviews of Books.

Report of the Education-Committee of the General Medical Council. Printed by SPOTTISWOODE & Co. 1890.

"A grand opportunity missed," is the depressing verdict which a careful perusal of the above begets.

After 1892 the duration of medical study is to be five years. If these five years had been devoted to genuine medical study, we should have had nothing but congratulations to offer; but as the first of these five years is devoted to studies which are not medical, and as the last year is to be given over to pursuits for which English medical institutions are not prepared, we are driven to adverse criticism. There are, in fact, but three solid years of medical study provided for in the new scheme. And these three years are to be softened down; the student is to be lectured at less. But, as a counterpoise to this freedom, the Committee recommend an increased attention to spelling (!) among those who desire to become a "member of a profession whose position is so high."

The Report of the Committee is so far from coming up to the standard we had expected, that we took the trouble to look up the personal record of the gentlemen who drew it up. The chairman, Dr. Struthers, late Professor of Anatomy at Aberdeen, is a tried and valiant fighter in the cause of medical education from the scientific side, of which alone he has experience. Unfortunately he is a profound admirer of the German and French systems, and still more unfortunately he was chairman. From Dublin we have Sir John Banks and Dr. Kidd, who have each been nearly half a century in the profession, and whose opinions should have at least historical value; and the Rev. Samuel Haughton, who possesses every conceivable capacity except the not unimportant one of teaching or practising medicine. Then we have Dr. Glover, of London, a gentleman who has not made his influence felt either in medical practice or in medical education; Dr. Batty Tuke, an authority on Lunacy, from

Edinburgh; Mr. Wheelhouse, of Leeds, an able practitioner of forty years' standing; and last, but not least, Mr. Mitchell Banks, of Liverpool, and Dr. Leishman, of Glasgow.

Now, these men, all of them, may be leading authorities on medical education, but, with one or two exceptions, they have never shown it. They are mostly men of standing in the profession, by duration as well as by repute. They have not all the same bent: they do not clash. Dr. Leishman might get a special winter session for Midwifery, if Dr. Haughton got one on Physics. Mr. Wheelhouse might secure a return to his favoured system of pupilage, as a counterpoise to Dr. Batty Tuke's stipulation for attendance on properly registered dispensaries and "Institutions." There is not an Arts graduate on the Committee (according to the *Medical Directory*) except Dr. Haughton, and with him, unfortunately, general culture is not united to medical practice.

These are the men. We have three or four aged physicians, a lunacy doctor, a couple of surgeons, an obstetrician, and a chairman who, being chairman, does not count. They meet and pass a comprehensive scheme of medical education; but they meet in nothing else. They pass an average which is an average of extremes, and therefore valueless. Each individual carries his own point; and the chairman, who has scarcely practised his profession at all, sees them all satisfied, and is satisfied also.

For a detailed criticism of the scheme we have no space. Nor is such detailed criticism necessary, for a few of its provisions are enough to condemn the whole.

And first as to the preliminary examination. It comes into operation on January 1st, 1892; it might have been in operation for a couple of centuries. "English Language, including Grammar and Composition"! The President of the Council in 1882 groans over the "persistent frequency of examples of bad spelling." Well, what does he expect? Latin of the most elementary; Mathematics comprising Algebra as far as Simple Equations; the first three books of Euclid, and a few optional subjects of no value. Here is the culture-test necessary for the aspirant who would enter what is grandiosely described as one of "The Learned Professions"; and here our "Education-Committee" lets it remain. It is a crying evil that at the threshold of the medical profession the entrance is made ridiculously easy, easier certainly than to the counting-house of a linen-draper. The Committee must have known this—the remarks of the President show that they ought to have known it—and they

seek to make no improvement. We cannot turn half-educated boys into cultured medical men. Unless the Registration Examination is made to be an index of general culture, the President must continue to lament ignorance of ordinary spelling and composition on the part of medical students; and teachers must continue to fail to raise the standard of medical knowledge. It is unjust to the students also: they are let in too easily, and they get out of their studies with too much difficulty; there are too frequent rejections at the medical examinations, and too many absolute failures. All this might have been amended if the Education-Committee had distinctly raised the standard of the Registration Examinations.

The first year of actual study is spent in studying the elements of science, which the student should have acquired before registration. To import general science into the purely medical curriculum is both unnecessary and deleterious. It is unnecessary, because nowadays in all teaching medical centres there are abundant outside opportunities for acquiring a knowledge of the scientific subjects named; and it is deleterious, because it robs the student of a year's work which, while being called "medical," is not medical at all. Four years' medical study should not be described as five. These subjects should be examined for in the Entrance or Registration Examination, but they should not be included among medical studies.

The next three years are to be devoted to the serious study of medicine; these we pass over. Let us see what is to be made of the fifth. This "should be devoted to clinical work at one or more of such Public Hospitals or Dispensaries, British or foreign, as may be recognised by any of the Medical Authorities mentioned in Schedule A of the Medical Act (1858); provided that of this year six months may be passed as a pupil to a Registered Practitioner holding a Public appointment or possessing such opportunities of imparting practical knowledge as shall be satisfactory to the Medical Authorities." Theoretically, these regulations for the fifth year seem to be sensible; but practically, we fear they will not work. The student is to devote his whole day to clinical work for six months at a hospital or allied institution, and, permissibly, for six months with a registered practitioner. To safeguard against the palpable dangers of pupilage to the registered practitioner will, at the outset, be very difficult. How would such a pupil always differ from the objectionable "unqualified assistant"? And is it not conceivable that such pupilage will simply be signified by the suggestive term

"signing up"? In the few cases where busy men would care to have private pupils and deal honestly and capably by them, is it expected that they would do so free of charge; or, rather, would such apprenticeship not be smartly charged for? If there is a demand there may be a supply, but the exchange value will be high.

As to the hospital clinical work, we fear that this is impossible, unless the rules of our institutions in Great Britain are greatly modified. Here our hospitals have many officers, with few beds; the hospital work is done during one or two hours of the day; during the rest of the day the senior officers are supposed to be earning their daily bread. The wards are then left in the charge of young residents. The clinical instruction, to occupy the whole day, must either be left to these assistants, or we must have a new set of officers, who can have a greater command of beds and more time to devote to them. In other words, they must be paid. On the Continent the system suggested is in force, but the whole hospital system is in keeping. In this country the hospital system must either be adapted to the continental, or the scheme suggested must be a failure. Unless Government takes over our hospitals and pays their medical men, giving them services of beds which occupy half their working time, we fear that to occupy the whole day of the student in clinical hospital work is impossible. In our largest schools, with comparatively few patients, the scheme is manifestly impossible; it would be very difficult to carry it out even where the schools are small and the clinical material abundant. Whatever may happen in the future, our means of working this part of the scheme at present are certainly inadequate.

There are several other details in the scheme open to adverse criticism, but we have said enough to show our general feeling about it. We believe it to be, not only no improvement, but a distinct retrogression. The time was ripe for a change, and a change that was to be an improvement would have been gladly welcomed on all hands. Education tests are advancing on all sides; the education test for medicine, universally admitted to be too low, is left stationary. Medical knowledge increases in bulk and complexity, and demands more general culture and better brains to master it. We import into the years available for medical education tuition in elementary sciences which should be the property of every schoolboy desiring to enter medicine. And, finally, a scheme of special clinical instruction is devised which, on the one hand, must upset and displace the system of prolonged clinical study at present in existence, and, on

the other, cannot be carried out under existing plans of hospital management.

What better can be said of such a scheme than that it is bad? It is true that we have ourselves to blame. We have put men who are honour-worthy into places of honour; we are clearly wrong in expecting that these men, already past their meridian, shall also lead us in new paths towards improvement. They lose their way and hark back on old paths, familiar to them, but now grown over with weeds and abandoned. The pity is that they can compel the young and the vigorous, who have discovered better ways, to follow in their courses.

Selected Subjects on the Surgery of Infancy and Childhood. Lettsomian Lectures for 1890. By EDMUND OWEN, F.R.C.S. London: BAILLIÈRE & Co. 1890.

There is some picturesque writing and a good deal of sound surgery in the small volume before us. Tropes and figures abound. Thus (p. 5), "setting up inflammation in the surrounding structures, and rendering the skin adherent and undermined, she (Nature) seeks relief from tension by carrying a lighted torch, as it were, among highly inflammable tissues." This process of "rendering the skin undermined" is then compared to what ought to have been in parallel language called "rendering the corn ignited" of the Philistines by Samson vivi-cremating the foxes.

"Keen with the scalpel" (p. 11) may mean more than appears, but it seems rather vulgar. "Picturesque anatomical neighbourhood" (p. 15); "the pneumogastric nerve evinced its resentment by setting up an alarming attack of dyspnœa" (p. 17); "they, and the tissues with which they are continuous, are always ready to pick a quarrel, as it were, with a surgical instrument" (p. 24), are a few of many telling pieces of rhetoric.

The author in operating for hare-lip sometimes leaves the lower lip too prominent. To diminish this prominence, he occasionally removes a "wedge-shape piece from the prominent lower lip." He desires it to be known that this is an original proceeding, and this is the neat way he urges his claim: "I will not presume to say that the idea is a novel one, or I may be favoured with a dozen strongly-worded notes to the effect that the plan has been resorted to in numberless bad cases since it was first recommended by some native Indian surgeon whose name it is difficult to spell, or by some

Russian operator whose name it is difficult to pronounce." "What I know not, is not knowledge," has recently been assumed by London surgeons other than the author. In this case, however, we honestly believe the author is safe: no surgeon is likely to dispute with him the honour of introducing an operation which, after doing away with too much of the upper lip, seeks to balance the fault by removing a piece of the lower. It is well, however, to know that a Lettsomian lecturer may indulge in the "playful-sarcastic."

The author is clearly a capable and original surgeon. Whether these lectures are worthy of the audience and the Founder, we do not presume to decide. We confess that we like to see lectures made interesting by means other than our author has adopted.

A System of Practical and Scientific Physiognomy. By MARY OLMSTED STANTON. Vols. II. Phila. and Lond.: F. A. DAVIS.

The ambition to write a book is, to-day, often satisfied by placing a few paragraphs, with a quotation or two, a preface and a dedication, between stiff boards. This has not satisfied our author. Two large octavo volumes, closely printed and profusely illustrated, seem scarcely to have fulfilled her desires; and what a queer mixture of philosophy and folly it is!

Read this: "The Kidney system creates or evolves *Conscientiousness, Integrity, Morality.* The *width* of the chin caused by the width of its bony structure causes conscientiousness as well as the strength and action of the Kidney system. A narrow, retreating chin shows that the kidneys are narrow and small; a broad, bony chin (if the eyes are well coloured) announces strong, large, or broad kidneys . . ."

Put this arrant nonsense alongside of the following: "A woman with a logical mind is as womanly in her nature as a man is manly who has an affectional nature, and who exhibits love for his wife and children, . . ." The outcome of this—the feeling of the affectional (*sic*) male reviewer towards the logical female writer—can in common courtesy scarcely be critical.

And yet the book is distinctly interesting. Few readers will be able to throw it aside without giving it something more than a perfunctory perusal.

The Shadow Test. By W. M. BEAUMONT. Pp. 38. London: H. K. LEWIS. 1890.

As far as it goes, this little book is good. It is another witness to the value of the Shadow Test in ophthalmic practice, and is written from the author's own experience.

The student will, however, find it wanting as a book of reference; and he is left entirely in the dark as to the optical conditions upon which the phenomena observed in this method of testing depend.

A book written upon this single subject is of little value unless it is exhaustive, which the present volume certainly is not.

We take this opportunity of pointing out that the direct method of estimating refractive error has the great advantage of giving practice to the observer, at the same time in seeing the details of the fundus of the eye, and in helping to make him at each estimation a better ophthalmologist; whereas the Shadow Test, though of undoubted value, especially in astigmatism, has no such combined advantage.

Notes on Preparations for the Sick.

Frame Food Preparations.— FRAME FOOD COMPANY LIMITED, London.

The want of phosphates in food is said to be a crying evil, and is to be remedied by the administration of these preparations extracted from wheat bran.

The invaluable nourishment contained in the bran is lost to the multitude who eat white bread, and the consequences are seen in rickety bones, bad teeth, weak muscles and nerves, poverty of blood, &c., &c.

Advocates of whole meal tell us that we should eat the bran in our bread; but the phosphates in the bran are tenaciously held by the particles of the innutritious and indigestible woody fibre, which not only does not nourish, but which does harm to the system. Moreover, although the use of whole meal bread has been preached for years, the majority of both children and adults have an invincible dislike to it, and some are made ill by it.

The following features of interest and importance are brought out by Dr. P. F. Frankland's analysis of "Frame Food:"

In the first place, "Frame Food" is shown to be composed, to the extent of 90 per cent., of organic matter and mineral salts, there being less than 10 per cent. of moisture in the sample (taken at hazard) examined.

Secondly, both the organic and mineral matters are exceedingly rich in nutritive ingredients. Thus nearly one-third of the organic matter consists of *albuminoids*, while the remainder is mainly composed of carbo-hydrates, which are in this case present in a readily soluble form; viz., as sugar and dextrine, while less than one-third of these carbo-hydrates are present in the form of starch.

Again, the ash consists mainly of phosphate of potash, and thus is rich in two of the most highly prized mineral ingredients of food. Moreover, *practically the whole* of this ash is readily soluble in water, and is thus immediately available.

The albuminoids, also, are present in a readily soluble form, and are, for the most part, not coagulated in boiling; thus about three-fourths of the total nitrogen remains in solution even in boiling water.

"Frame Food," therefore, differs essentially from ordinary flour and other common farinaceous food stuffs—

1. In its greater richness in mineral salts, and notably in phosphoric acid and potash.
2. In its greater richness in nitrogen.
3. In the carbo-hydrates being largely in the soluble form as sugar and dextrine.

By a purely mechanical process—no chemicals are used—the woody particles of bran have been exhausted of their nutritious contents; the woody refuse is thrown away, and the pure soluble extract (containing over 10 per cent. of phosphates) is available for adding to white flour, for bread, and to every form of starchy and farinaceous food.

We have received the following preparations of "Frame Food":

Extract Powder.
Infants' Diet.
Porridge.
Jelly, for use as jam, or like malt extract.
Biscuits.
Drink Syrup, non-alcoholic.
Pralines, nourishing sweets.

Innumerable formulæ are given for the preparation of various articles into which the "Frame-food" powder may be introduced.

If mankind were compelled to have a diet-table limited to one kind of food, doubtless "Frame Food" would be the one to choose. We cannot but welcome the series of preparations as a useful variation in, and addition to, the dietary of the sick.

Patent Refined Isinglass.—G. P. SWINBORNE, London.

This has long been in use for the preparation of various dietetic articles, more or less nourishing, for the sick-room.

The scepticism with regard to the nutritive value of gelatin has not sufficed to displace it from the high position it has always held as an article of food in health and disease. The various experiments on dogs showing that life and health could not be sustained on gelatin alone, have not been considered proof that a substance so nearly allied to albumen should have little or no nutritive value. The experiments of Dr. Edward Smith, and others, have proved that gelatin is food, since it increases vital action in the same direction if not in the same degree, as albumen: these observations are quite in accord with the universal experience and belief of non-

scientific people, that jelly is a valuable food. The purest kind of gelatin is isinglass from the sturgeon: its advantages over ordinary gelatin are—its lighter colour, less flavour, and greater thickening power. Its great utility lies in its culinary uses, rather than its actual nutritive value, which must, under ordinary conditions, be greatly diluted by water.

It may be taken in tea, broth, or milk. It dissolves readily in any warm liquid; all that is necessary is, to soak it for a minute or two and stir gently till it dissolves. The convalescent can use it in many ways, according to recipes enclosed in every packet.

Caffyn's Liquor Carnis —THE LIQUOR CARNIS COMPANY LIMITED, London.

This comparatively recent addition to the dietary of the invalid is a highly condensed raw extract of meat containing much soluble albumen, and, therefore, is of high nutritive value.

It claims support on the following grounds:

1st. That it is peculiarly rich in nutritive material. The truth of this statement, as regards its most important albuminoids, may be verified in the simplest manner by heating to a temperature of 120° F. a small quantity in a test-tube or spoon, and noting the change consequent upon the coagulation of albuminoids previously held in solution.

2nd. That it presents its large proportion of nutriment in the natural form, so that its proteolysis and absorption are quickly carried out with a minimum of labour to the digestive apparatus.

3rd. That it causes not the slightest irritation throughout the digestive organs, and can therefore be taken even by the most weakly infant, with perfect safety.

4th. That it contains no *excess* of salts, nitrogenous waste matter, and *no added salts*.

5th. That it supplies all the nourishment required, in very small bulk—an advantage which is of no small moment in the successful management of many serious ailments.

Wiesbaden Kochbrunnen Salts.
Natural Carlsbad Sprudel Salt.
Franz Josef Bitter Water.

There is no lack of variety in waters and salines. Now that the habit of drinking hot water is so general there is no difficulty in the addition of some salt or saline to increase its

efficacy. Patients are fully recognising the necessity for flushing the tissues, in order to wash away poisonous excreta; and the habit of using mineral waters at home, when it is inconvenient to visit the source, is encouraged by the increasing custom of distributing the concentrated salines in a convenient form.

The **Kochbrunnen Salt,** from Wiesbaden, dissolved in hot water is likely to be of the same utility as the water from the spring, which has a well-deserved reputation in all catarrhal conditions of the alimentary tract.

The **Crystallised Sprudel Salt** is neutral, white, and transparent, and forms hexagonal prisms of an oblong shape. Its taste is bitter and salty. It has a mildly dissolving effect.

The **Powdery Sprudel Salt,** obtained by evaporation and subsequent impregnation with the natural carbonic acid of the Sprudel, is an alkaline remedy, easily soluble, and, taken in large doses, acts as an aperient.

The Sprudel salt may be used either to assist the effects of the Carlsbad water or as a remedy by itself. In the latter case the dose is one or two teaspoonfuls, either in a dry state or dissolved in water. It dissolves rapidly and completely in warm water, and in this form a curative effect may be expected with more certainty. It is advisable to use water at a temperature of 40° to 50° R. This, however, does not exclude its being taken with cold water. If the solution becomes a little turbid, as it is likely to do with hard water, this does not affect the working of the salt at all. The best time for taking the salt is in the morning, shortly before breakfast, fasting.

PERISCOPE.

MEDICINE.

Notes on a Mode of Treatment by Vaccination of Experimental Tuberculosis by M. Granchet and H. Martin.—In view of the publication of his experiments on inoculation for tuberculosis by Professor Koch, the authors think it advisable to publish their own experiments.

Rabbits were the animals chosen for the experiments, as in them artificial tuberculosis, with constant easily-recognised

lesions, can be induced with certainty. Their plan was to inoculate rabbits with a given quantity of vaccine in the vein of the ear, taking some in which artificial tuberculosis had been induced, and others free from tuberculosis in order to control the results. Their researches extend over two years. They employed vaccines of varying strength, down to those whose virulence was *nil*, and so formed a rough scale of degrees of virulence, after the method of M. Pasteur. They called the most powerful vaccine, which kills a rabbit in from fifteen days to a month, No. 1; and the others, Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, according to the degree of virulence. Nos. 2 and 3 are always fatal, but after an interval of time varying according to the resistance offered by the animal. Five rabbits, on August 27th, were inoculated each with a half-syringe of strength No. 6; on 3rd September, and again on 12th with No. 6; then on 26th September with No. 2, and on October 15th with No. 1. Three rabbits, as a control experiment, were also on October 15th inoculated with No. 1, and died from 28th October to November 5th with classical lesions of tuberculosis. Of the vaccinated animals, three died in the same time as these last, and with the same lesions; but one survived to December 17th, and the other to January 7th, 1890, and only slight tuberculous lesions were found. The authors then made a new series of inoculations, with more frequent vaccinations with the weaker vaccines, stopping altogether with No. 2. They obtained results from this which they considered showed a more doubtful immunity from the disease, as the time for which healthy rabbits survive after inoculation with No. 2 varies much. In a last series, therefore, they vaccinated eleven rabbits with Nos. 6, 5, 4, 3, and 2, from January 30th to March 25th, 1890; and on April 10th, with No. 1: two healthy rabbits were also inoculated with No. 1 on this day, for control. The two latter died on May 3rd and 10th. Of the other eleven, two died on 16th and 26th June; two on 7th and 29th July; four on 4th, 7th, and 9th August; three are still alive, more than three months after the most virulent inoculation. They believe that their results show that by their vaccinations rabbits obtain a prolonged power of resistance against experimental tuberculosis, and an immunity from the effects of the disease, of which the duration remains still to be determined. The nature of the vaccine is not stated.—*Gazette des hôpitaux*, August 21st, 1890. J. M. C.

Varices of the Œsophagus and Hæmatemesis in Chronic Alcoholism.—At a meeting of the Société Médicale des Hôpitaux, M. Letulle related the case of a man of

40 who suffered from hæmatemesis recurring about every two months, preceded by pains radiating from the stomach to the arms, and a general feeling of malaise. The blood gushed from the mouth and nose, was quite pure and unmixed with food. The spleen was large; the liver of normal size. The diagnosis of atrophic cirrhosis, with œsophageal varix, was made. After some months the patient had pleuritic effusion on the right side, and died of a very large hæmorrhage. The autopsy disclosed slight fatty degeneration in the liver; a very large "cirrhotic" spleen; some peritonitis; thrombosis of the superior and inferior mesenteric veins, and enormous varicose veins of cardiac end of œsophagus. In his remarks on the case, M. Letulle said that most instances of œsophageal varicose veins occurred in cases of chronic alcoholism; their mechanism, however, had not been thoroughly elucidated. Atrophy of the liver was not a constant lesion in these cases, and in many of them the state of the peritoneum and great intestinal veins was not noted. M. Debove said that it was well-known that in atrophic cirrhosis, hæmorrhage from the stomach or intestine was a frequent and formidable complication; moreover, it often occurred before the production of ascites, at a period of the disease when the diagnosis was difficult. He did not think that the obstacle to the circulation through the liver was the cause—at any rate, it was not the sole cause—of these hæmorrhages, for they did not occur after closure of the great venous trunks by a ligature or by a clot; and in the course of atrophic cirrhosis, they often occurred in the pre-ascitic period, when the hindrance to the portal circulation was not at its maximum. Can alcohol cause directly morbid changes in the gastric and intestinal capillaries? There is no certain evidence of this. In only three out of the very many cases of this class observed by M. Debove was there rupture of œsophageal varices; their lesion, then, is probably rare. He considered that the most probable cause of hæmorrhage in cases of cirrhosis was an intense congestion of the portal system. In the maintenance of the blood at an almost constant pressure in the arterial system, one of the most important means of counteracting the various influences which tend to cause it to vary lies in the regulating apparatus provided by certain parts of the venous system, which are capable of storing large quantities of fluid. The portal system of veins pre-eminently acts in this way, as the researches of Ludwig and Cyon have shown. Under vasomotor influences, a more intense congestion can be observed in the portal than in any other venous system. In a healthy man this congestion does not give rise to hæmorrhage, because the liver can

hold a very large quantity of blood, and the passage of the blood into the vena cava is easy. This the liver can no longer accomplish in cirrhosis, and an intense congestion of the portal system will then be followed by hæmorrhage. These hæmorrhages occur less often at an advanced stage of cirrhosis, probably because ascitic fluid exerts a counter-pressure on the veins, and the patients are, moreover, very anæmic. The ruptures take place in the capillaries of the mucous membrane, and on account of their number and small size cannot be detected at the autopsy. Should there be a *locus minoris resistentiæ*, as in the case where œsophageal varices exist, rupture will occur there; under these circumstances, the trunk of the portal vein itself has been found ruptured in two or three cases, reported by Frerichs and by Wilks and Moxon.—*L'Union médicale*, October 23rd, 1890. J. M. C.

Pneumonia after Injury.—The following case, related by Minossi, illustrates how slight an injury may lead to pneumonia, as well as the readiness of the disease to recur. It is, moreover, remarkable for the very early recurrence, and shows that the opinion about the disease conferring a temporary immunity on the individual is not always warranted. The patient, a man of 54, was admitted into hospital on October 26th, 1888, suffering from a right pneumonia, which he "went through" well, and on the 19th November he was to have been discharged. On the morning of that day, while dressing, he was seized with giddiness and fell a short distance, striking the right side of his chest against the iron frame of the next bedstead. Some of his fellow-patients raised him and put him to bed, and during the remainder of the day he complained of nothing more than a slight pain in his right side. On the 20th the temperature rose, and the sputum became rusty. An accurate examination was made on the 23rd, when the expectoration was found viscid and rusty; temperature, 101·6°; pulse, 120 running; respirations, 36. Anteriorly, the note was tympanitic on percussion on the right side, with numerous crepitations and crepitant râles on auscultation. On the left, the breathing was harsh. Behind, on the right, respiration was imperceptible at the base, and the vocal fremitus weakened; above, it was increased, and rhonchi heard. On the 24th the general state was worse, and the following morning patient complained of pain in the left side, anteriorly. He died on the 26th. At the autopsy, no marks of contusion were found on the skin of the thorax. Effusion was found in both pleural cavities, and in the pericardium it was tinged with pus. The lower lobe of right lung was com-

pressed somewhat by exudation, and adherent to chest wall. Just above this, corresponding to the point where the chest was struck, the parietal pleura was hyperæmic, with hæmorrhages. The whole upper and part of the lower lobe was in a state of croupous pneumonia. On the left, acute pleurisy, and lung œdema with recent pericarditis, were present.—*La Riforma Medica*, No. 148, 1890. D. R. P.

Surgical Dressings.—At the Tenth International Medical Congress, Professor Bergmann communicated to the members of the Surgical Section the following account of his ordinary method of dressings:—For two years Bergmann has exclusively used the aseptic in place of the earlier antiseptic methods in operations. This is based on the ascertained fact that the infection of wounds occurs through the air in very few cases only. The dust which falls from the air, and contains germs, only comes into contact with wounds for a very short time, and does, therefore, generally no harm. Besides, the surface of wounds can be protected from atmospheric dust by covering it with compresses as much as the operation permits. In order that the operation-room should contain as little dust as possible, the walls should be quite smooth and easily purified. This is not the case in the Berlin Clinic; for it was built at a period when the importance of atmospheric dust on the infection of wounds was not understood. The boards of the room are kept constantly damp, so that the particles falling from purulent wounds may not rise into the air, since it has been proved that from moist surfaces no microbes ascend.

Every care is taken that no infection of the wounds occurs by direct contact. To this end it is ordered that—

1. The skin of the patient be purified before the operation, both over the place where the wound will be made and for a considerable distance around it, in the following way:

The skin is first lathered and shaved. Next it is again thoroughly washed and lathered with sterilized water and glycerine-potash soap. It is then dried and thoroughly rubbed with a sterilized towel. The Professor insists on the importance of this rubbing being thoroughly and sufficiently carried out, because by it the upper layers of the epidermis are removed, on and in which lie the impurities which contain pathogenic microbes. Next the skin is washed with 80 per cent. alcohol, and, finally, with a 1 in 2,000 solution of sublimate.

2. The hands of the operator and assistants are purified and disinfected in exactly the same manner. Brushes which

are kept in a 1 in 2,000 sublimate solution are used to purify the hands. Bacterial experiments show that brushes which lie exposed on the washstand contain great quantities of bacteria; therefore, they must be kept in solution.

3. Before each operation, the patient is laid on a dry cloth which has been sterilized, and is covered with a similar cloth, so that only the region which is to be operated on remains uncovered and accessible.

4. The instruments before use are boiled in a one-per-cent. solution of carbonate of soda for five minutes, in a vessel prepared for them, and which stands in the operation-room. In this they remain until they are used for the operation. If they become impure during the operation, it is sufficient to dip them for some seconds in the boiling soda-solution, which stands ready, in order to make them again pure and sterile.

In this way he succeeds in keeping them, not only perfectly sterile, but also sharp and free from rust. The visitors to the Clinic will have the opportunity to convince themselves of the advantages of this procedure.

5. During operation the bleeding is attended to with the greatest care. No sponges, but pads of previously sterilized wool are used for this. They are soaked in no antiseptic, but pressed dry on the wound and then thrown away. All vessels are secured with torsion forceps or Pean's clamps, and tied with catgut. The wound is not closed with stitches until perfectly dry and not a drop of blood is escaping. The gut threads are prepared from the catgut of the shops by being rolled in a single layer round thin plates of glass, and then laid in a five-per-cent. alcoholic solution of sublimate. The solution is at first renewed frequently, till it remains clear. The glass slips, with the threads, remain lying in it until shortly before use, when they are steeped in a simple one-per-cent. solution.

6. The silk employed for sutures is not sterilized in antiseptic solutions, but in steam.

7. The essential conditions for aseptic operations are the sterilization of all surroundings which come into contact with the operator, the assistants, and the patient. To this end, all towels in the operation-room, as well as the cloths upon which the patient lies and the linen overalls which the operators put on, are placed, shortly before the operation, in a disinfecting apparatus of Rietschel and Henneberg's make. In this sterilization is carried out by a jet of steam, after the principles developed by R. Koch. Such an apparatus is placed in the pavilion adjoining the operating-room, and its action will be explained to visitors. An electrical thermometer,

placed in the middle of the linen in the apparatus, shows the moment when the steam, which rushes through it with great rapidity, reaches the temperature of 100° Cent. The articles remain half an hour from that moment in the chamber, when all organic particles and microbes in them are killed. The stuff is then perfectly sterile.

8. Exactly in the same way, all dressings are made germ-free in the same apparatus. The recent ones have been obtained from Böhm's factory (75 Oranienburger Strasse, Berlin). They are cut into pieces of the form and size for operations and dressings, and next placed in linen bags. The bags are tied up and put into the disinfecting apparatus. The wadding and roller-bandages are treated in the same way. All these stuffs remain in the bags, and the bags inside the disinfecting chamber until they are used. They are then taken out, laid on a sterilized towel, and covered with another on the operation-table. The attendants who take them from the bags have previously disinfected their hands in the previously described manner.

When purulent and tuberculous bones and joints are operated on the method employed in the clinic is, on the whole, the same. There is the same purification and disinfection of the region where the operation is performed; but the wounds are not closed immediately after the operation, but are filled with iodoform gauze, *i.e.* a soft dressing material into which iodoform powder has been rubbed. This remains in the wounds from one to two days; it is then removed, and the wounds, now first after forty-eight hours, are closed by sutures. These wounds heal by first intention without pus, though they are kept through two days plugged with iodoform gauze.—*Deutsche Medicinische Wochenschrift*, Aug. 7th, 1890.

G. P.

THERAPEUTICS.

Salol in Enteric Fever.—M. Hirtz has employed salol to produce intestinal antisepsis. In enteric fever he gives a dose of 3j. in the twenty-four hours, with salicylate of bismuth. He thinks that by this medication intestinal antisepsis is better attained than by naphthol, and it has the advantages over the latter that it is well borne by the patient and also disinfects the urinary tract. In the intestine salol is decomposed into phenic and salicylic acids, which are powerful antiseptics and antipyretics. He gave salol in daily dose of 3jss. for three weeks to one patient, without causing any gastric disturbance. Given with bicarbonate of soda he has found salol useful in gastric ectasia.—*L'Union médicale*, Nov. 9th, 1890.

[I have found that naphthol or hydronaphthol is well borne by nearly all patients, and effectively produces intestinal antisepsis when administered according to the plan given in *The Practitioner*, July, 1890.] J M. C.

Strychnine in Cerebral Affections.—From a series of pharmacological experiments, Dr. E. Biernacki has arrived at the following results:—1. Strychnine acts on the brain, producing diminution of cerebral excitability. 2. It is doubtful whether strychnine produces a direct influence upon the grey substance of the cortex; the decrease in excitability is probably called forth by the irritability of the cord, and perhaps, also, of other parts of the nervous system. 3. Favourable results of strychnine in dipsomania and sleeplessness may be explained by this action. The alkaloid is, as already known, of great service in dipsomania and as a palliative in epilepsy of the cortical form. In both cases it had been used empirically, and no explanation given. More recently Lauder Brunton has advocated strychnine as a hypnotic in sleeplessness caused by strain of the nervous system, where opium and other narcotics gave no good results; bromide of potassium was without effect; and in one instance, after chloral, he observed a maniacal condition. Strychnine acts best in that state in small doses, $\frac{1}{100}$ gr.; or in form of the tincture of nux vomica, 5—10 drops. It was useful, likewise, in brain anæmia. Biernacki thinks it desirable that it should be tried therapeutically in different states of irritability of the cerebral cortex.—*Therapeutische Monatshefte*, No. 8, 1890. D. R. P.

Bromoform and Phenacetin in Whooping Cough.—Bromoform was first used in whooping cough by Stepp, who claimed to have seen, in one hundred instances, recovery within two to four weeks. Dr. H. Neumann has recently tested the substance, having treated twenty-five out of sixty-one cases with it. The dose was a few drops (2—5) suspended in syrup, and no ill effects were seen. Where the drug was useful, this showed itself in a few days; the number of attacks being lessened in some cases, and in others the intensity of seizures diminishing—the latter effect being more frequently observed. It is not at all certain that bromoform can shorten the duration of the attack; for even with continuous and energetic administration, the convulsive stage lasted its usual time. Neumann's opinion of this treatment is, that it had mostly a good effect upon the seizures, and it might be recommended on account of its freedom from evil consequences and not unpleasant taste; but it is not more a specific for

pertussis than quinine, antipyrin, and other substances. With these and other remedies, varying results are obtained in the same epidemic—some shorten attacks, others have no result.

Writing of Phenacetin, which has likewise been advocated, Neumann says that he gave it in nine cases, the quantities ranging from $\frac{1}{5}$ gr. to 3 grs. several times daily. In a girl seven years old, suffering for three weeks from whooping cough, the attacks became at once lighter, shorter, and fewer in number, and got worse on intermitting the phenacetin; but in the other instances no appreciable advantage was observed.—*Therapeutische Monatshefte*, No. 7, 1890.

D. R. P.

OBSTETRICS.

The Binder.—To bind or not to bind the parturient female is a question with which the obstetrician still allows his mind to wrestle. At a recent meeting of the Obstetrical Society of London it was concluded in effect that the doctor had better do as the patient felt inclined. The matter ought not to be left in such a doubtful state. Kingdoms rise and fall, great nations disappear, cyclonic storms and volcanic fires change the face of nature, but babies continue to be born and the mother insists on having a binder, or knowing the reason why.

The Obstetrical Society of London should not trifle with topics of such eternal moment. For our part, we say do not bind. The alleged comfort secured is imaginary, the idea that the binder can restore the figure is unscientific and unphysiological, its supposed power in helping involution is purely hypothetical, and the whole conception of a binder is unnatural and abhorrent to common-sense.

The binder is a relic, not of barbarism, for barbarians are too sensible to bind, but of a half-enlightenment that is worse than ignorance. The physician who binds nowadays does it out of a weak complaisance to an imperious mother-in-law or officious nurse. He should, out of respect to his art, rise above such trammels to his medical skill and his intellectual independence.—*Medical Record*, May 31st, 1890.

L. M. G.

SCRAPS

PICKED UP BY THE ASSISTANT-EDITOR.

The Successful Treatment of Obesity.—It is said that for this condition nothing is so efficacious as a few weeks' residence in a boarding-house where the person is "treated as one of the family."

An Eye to Business.—A certain doctor, who was noted for a keen eye to business, was driving along the street of a country town, when his horse took fright and ran away. He was thrown violently out of his trap and rendered senseless. Presently he recovered a little from his unconsciousness, and, noticing the crowd which had gathered about him, asked, "What's the matter, gentlemen? Anybody hurt? I am Dr. B. Can I be of any service?"

Oriental English.—The following testimonial was forwarded some time back to an English physician in the East:—"Dear Sir,—In July last my wife was down with fever and rheumatism of severest type, and I have to acknowledge with warmest and sincerest thanks the amiable and cordial assistance given by you in rescuing her at a time when all hopes of her existence were abandoned by one and all in the family, and even by professional men, who cried, '*Cui bono* are all our efforts?' You have attended on her without any torment, and without any exorbitant authoritative extortion, rather oppression, which some harpies doctors are apt to demand at such a critical juncture, and treated her gratuitously, harmonised with your native English, and unanimodes, and with such patience and diligence as the occasion demanded. Before concluding, I beg to state I am bidding my beads, and pattering my fervent prayers to the Almighty God to vouchsafe you with longevity, health, wealth, and prosperity."

Medical Libraries.—In view of the library which the Bristol Medico-Chirurgical Society has decided to establish for the use of its members, the following extracts from speeches made at the opening of the new building, which is to form the home of the New York Academy of Medicine, will be of interest The building in question is to furnish accommodation for a large library, with reading-rooms and commodious meeting-rooms for medical societies. Dr. Alfred L. Loomis, in the course of the president's address, said that, with a library capacity for 200,000 volumes and a well-selected library of 50,000 volumes, supplemented by the largest and best collection of journals to be found in that country, they might rightfully maintain that they were in some degree meeting the highest requirements of scientific medicine. The influence which such a library would have, not only on the intellectual status and culture of the profession, but upon its moral tone, could not be estimated: for there is an atmosphere about a large and well-selected library which does not favour the growth of a mean, money-calculating spirit; it conduces to broadness, tolerance, and a love of the higher and nobler attributes of man. Dr. Edward L. Keyes, in the Anniversary Oration, said that the library was founded by donations in 1877, and never bought a book till 1879, eleven years ago; yet now, safely housed in a fire-proof house, they were proud in possessing the third place numerically among the medical libraries of America, and the fourth place, as far as he could learn,

among the purely medical libraries of the world. Dr. A. Jacobi said that thirty-three years ago there was no library at all, not even a medical reading-room in the city. It took many years before the Journal Association was organised, which furnished in a room fitted up for the purpose at No. 64 Madison Avenue, the current medical journals. Occasionally a sum was raised by voluntary contributions, for the purpose of buying the collection of a deceased member, certain publishers would present us with their publications, authors donate copies of their writings, fellows and others give old and new books, and men interested in special branches of literature furnish a shelf-ful of special works. That was their library. Thus it grew, slowly but steadily. The library, the representative and exponent of all medicine, is no longer a mere collection, but a vitalised organism. That is why there is an atmosphere of solemnity in a large library; for we are standing in the presence of the spirit and soul of all previous ages, each evolving from and connected with its neighbour. That is why a library is to the scientist what the church is to the pious. No consideration of lucre invites us there. While nourishing our minds, we disconnect ourselves from the embarrassments of trivial employment and deliver ourselves from the merely terrestrial. In that way the idealism is nurtured that no feeling and thinking man is to be without; idealism, without which no nation can expect to live. When she lost it, even Hellas perished, though she had given birth to Solon, Pericles, Aristides, and Sophocles. Dr. John S. Billings said that in the library we may at all times counsel with the wise and illustrious of our profession of all times and countries, living and dead, upon whatever subject most interests us. We can always find good company there; they are never in a hurry, never obtrusive, and while they cannot always tell us what we want to know, they can usually tell us something new that we ought to know, provided we question them aright. There should be a large expenditure upon periodical literature; for it is the papers and figures in these which the physician most frequently wishes to use to enable him to solve his own problems or to instruct others. Every physician should take five journals. Every medical teacher and every specialist should take a dozen. Every Medical Journal Club and small library should take from 25 to 50; every large medical library should take from 150 to 300; and the national collection in each country had better take them all, say 1000 or more. For journals, transactions, and reports, the physician must largely rely upon some general library. (For full reports of the opening reception see *New York Medical Journal*, November 22nd and 29th, 1890.)

Although this new departure of the New York Academy has been possible with a membership of less than 700, not even the most sanguine can hope that the Bristol Society can do anything approaching it. But, with co-operation and public spirit, the recent resolve to have a local medical library might result in incalculable good to the whole profession of the neighbourhood. The example of others who felt, as we feel, the want of a representative collection of medical works, and who, from a beginning certainly not larger than ours, have done so well, should stimulate us to make a strong and united effort to obtain that which will go a considerable way to meet some of our needs. This library of the Bristol Medico-Chirurgical Society deserves the liberal support of the local profession; for if aided, as it might be, by amalgamation with the Medical School, which now seems within measurable distance of getting its much-needed new buildings, it might lead to our possessing at no distant date a home which shall be the centre of medical life for this neighbourhood.

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J. W. Arrowsmith, Printer, Quay Street, Bristol.

Koch's Treatment of Tuberculosis.

We present to our readers, in the form of a supplement to the present number, an account by Drs. Markham Skerritt and Barclay Baron of their observations during a recent visit to Berlin, and also a paper on the above subject read by Dr. Wethered at a demonstration given by him at the Bristol Royal Infirmary. In the next number a report of the cases treated at the Infirmary, and of a case treated by Dr. A. J. Harrison at the Bristol General Hospital, will be published.

APPENDIX.

Koch's Treatment of Tuberculosis.

BY

E. MARKHAM SKERRITT, M.D. Lond., F.R.C.P.,

Senior Physician to the Bristol General Hospital, and Lecturer on Medicine at the Bristol Medical School;

AND

BARCLAY J. BARON, M.B. Edin.,

Physician to the Throat Department of the Bristol General Hospital, and Lecturer on Pathology and Morbid Anatomy at the Bristol Medical School.

The following is a brief account of the results of Koch's method of treatment of tuberculosis, as observed by us during a recent stay in Berlin, whither we went as representatives of the Bristol General Hospital. We arrived in Berlin on Friday, December 5th, and remained there until Saturday, December 13th. We consider that our visit was well timed, inasmuch as we were able to see cases that had been under treatment for such a period as to permit of fairly definite statements as regards results.

Medical Berlin is practically given up to the study of Koch's method, and in the many Hospitals and Kliniks of the city we were enabled to observe a very large number of cases presenting the results of the treatment under the most varied conditions: at the Charité, under Professors Leyden, Fräntzel, and Gerhardt; at the Lazarus Hospital, under the direction of Professor Langenbuch; and in the Kliniks of Professors von Bergmann and B. Fränkel, and Drs. Cornet

and Levy; and, owing to the kindness of the Secretary, Dr. Patschkowski, and the President, Professor Liebreich, we had the opportunity of seeing Koch's original cases, at a demonstration given to the Hufeland Society by Professor Paul Guttmann, at the Moabit Hospital. We cannot sufficiently express our gratitude for the unvarying courtesy and kindness which we experienced on all hands during our stay in Berlin, and for the facilities afforded us for the careful individual examination of patients.

The description of Koch's fluid has been so often given that it is needless to repeat it here. As is well known, the original fluid is never used for injection, but a 10 per cent. solution is prepared, from which is made a 1 per cent. solution; the latter only is employed, except when the dose is larger than is contained in one syringeful of the weakest solution. The original fluid has not been known to decompose, but it is considered better to make the dilutions with a half-per-cent. solution of carbolic acid; the 10 per cent. dilution does not then change, but the 1 per cent. dilution may decompose if kept for any length of time. The special syringe recommended by Koch can now be obtained of Messrs. Ferris & Co., of Bristol: but we found that some physicians in Berlin preferred the ordinary hypodermic syringe, as simpler and equally efficient; others, again, use the latter with an asbestos piston, which they consider more easily disinfected. Koch's syringe is best filled by removing the ball and attached stop-cock, and pouring the fluid directly into the barrel. If it is purified with absolute alcohol, as recommended, the whole of the alcohol must be expelled before the syringe is again filled, as otherwise the fluid may become turbid.

The injection is usually made between the scapulæ, where the skin is thick and little sensitive; but the fluid may be injected subcutaneously anywhere, and we saw no greater irritation when the side or front of the chest was selected:

in fact, provided that the usual precautions as regards cleanliness are taken, it would appear that suppuration at the site of puncture need not be feared.

It cannot be too clearly recognised that the fluid produces general reaction in health as well as in tuberculosis, and that the difference is simply one of dose. While in health the smallest dose that produces any effect is about 1 cgr., which causes only slight pains in the limbs and transient fatigue (although sometimes a rise of temperature to 100.4°), in tuberculosis one-tenth of this quantity (= 1 mgr.) will often produce severe reaction both local and general, and one-fifth (= 2 mgr.) has led to a fatal result. In all diseases other than tuberculosis the effect is the same as in health.

In tuberculosis the general reaction consists in fever, which may be ushered in by rigors, but more often by chilliness, and may reach 102° F., 104° F., or even 106° F., or more, as will be seen from the annexed charts. This is accompanied by pain in the limbs, headache, cough, great lassitude, nausea, and often vomiting: the symptoms usually begin four to five hours after the injection, and last twelve to fifteen hours.

In a typical case tolerance is generally quickly established, so that ultimately a large injection produces much less febrile disturbance than a small one did at first. The explanation given of this is that with each succeeding injection less tuberculous tissue remains to be acted upon. This diminished reaction we noticed with greater regularity in lupus than in internal tuberculosis.

The various types of temperature reaction with which we have met may be placed under the following heads, which are illustrated by charts selected from a large number in our possession:

I. Typical reaction: charts 1, 2, and 3. Marked reaction to small early dose, diminishing reaction to the same or even to increasing doses. The explanation of this is given above.

II. Increased reaction to the same or a diminished dose: charts 4, 5, 6, and 7. This is a type not uncommonly observed in phthisis and in tubercle of glands: and the explanation which finds most favour is that the tubercular deposit is encapsuled by comparatively non-vascular tissue, and that as the capsule is gradually broken down by successive injections the tubercular material is more freely exposed to the remedy circulating in the blood, and therefore greater reaction results. This theory is not altogether satisfactory: *e.g.*, in the case from which chart 4 is taken Professor Leyden expressed the opinion that the anomaly was due to increased weakness of the patient; and its occasional occurrence in lupus is not easily explained.

III. Prolonged or deferred reaction: charts 8, 9, and 10. This group includes cases in which the reaction extends over two or more days, and is apt to be irregular. The cause of this modification is doubtful; possibly idiosyncrasy or some peculiarity of local reaction.

IV. Effect of reaction on hectic: charts 11, 12, and 13. This may be—

(a) *Favourable;* when there is a tendency for the substitution of the reaction type for the hectic type, as in charts 11 and 12.

(b) *Negative;* where the hectic persists unaffected by reaction, as in chart 13.

V. Fever originated by injection: charts 14 and 15. This group includes cases where the treatment has a distinctly prejudicial tendency; a previously low temperature being supplanted by fever of hectic type, apparently originated by the reaction and persisting independently of it. In at least three cases of phthisis death has occurred from exhaustion due to the persistence of fever thus set up.

Apart from variations in the type of fever produced by the injection, other peculiarities are occasionally met with. A

rash is not uncommonly present; it has been described as like that of measles, but often resembles that of scarlet fever. In a case of lupus erythematosus at present in the Bristol General Hospital, under the care of our colleague Dr. Harrison, there has been marked general and local reaction, accompanied by an intense scarlatiniform rash over the trunk and upper part of the thighs, followed by slight desquamation. Rosenbach describes a papular and vesicular rash (*Deutsch. Med. Woch.*, No. 49, 1890). Lindner (*Deutsch. Med. Woch.*, No. 51, 1890) records a case where the third injection produced over the body, thighs, and arms an erysipelatous rash, with bullæ, followed by much discharge and scaling. We have seen herpes labialis in several instances; and in a boy under the care of Professor Langenbuch, an eruption consisting of papules, which afterwards became scaly, scattered over the surface of the body. Langenbuch was of opinion, however, that this was really the manifestation of a local reaction in small scattered tubercular nodules. Jaundice to a moderate degree is sometimes met with; this is regarded by Rosenbach (*Deutsch. Med. Woch.*, No. 49, 1890) as hæmatogenous, dependent on destruction of albumen in the blood or tissues, the process being analogous to what occurs in septic poisoning. Slight albuminuria may be present during the febrile paroxysm, probably due simply to the rise of temperature, as in other feverish conditions; and Rosenbach (*Deutsch. Med. Woch.*, No. 49, 1890) relates one case of tuberculosis of the bowel, in which the total amount of urine secreted in twenty-four hours after the injection was only one ounce and a half; the urine was dark brown in colour, and became solid on boiling. The spleen is sometimes enlarged. Diarrhœa not infrequently occurs. No cardiac complications have been met with beyond the collapse that may be induced by the intensity of the reaction. The pulse is usually rapid in proportion to the fever, and we have seen it as high as 130 to 140; it is frequently markedly di-

crotous. We did not note irregularity in rhythm. The various lung complications that have been met with are usually regarded as part of the local rather than the general reaction. Slight delirium sometimes is present at the height of the paroxysm, and in cases where the reaction has been so intense as to threaten life patients have been comatose for varying periods. In a patient mentioned by Ebstein (*Deutsch. Med. Woch.*, No. 51, 1890) eight attacks of convulsion occurred, but there was considerable evidence in favour of the existence of cerebral disease. Profuse sweating sometimes occurs, mostly after the height of the paroxysm has been reached.

The general reaction, as is well known, is accompanied by a *local* reaction, which, according to Koch, is limited to parts affected with tuberculosis, and therefore varies with the site of the disease.

It is best seen in *lupus*, on account of the superficial position of the lesion. In a few hours after injection swelling and redness of the lupus spots commence, and increase during the fever, sometimes to such a degree that the diseased tissue becomes brownish or necrotic in places. In a case of lupus of the nose that we saw in Professor von Bergmann's Klinik, at one time the nose was so black that gangrene was feared; but this was happily averted. After the subsidence of the fever, the swelling gradually lessens and disappears in a few days. Serum exudes from the lupus spots and dries into crusts, which fall off by degrees. Each succeeding injection produces less effect, until in a favourable case scarcely any local reaction can be detected. The result of the treatment is to convert the specific nodular growth into a healthy granulating surface, which looked to us just like that resulting from a superficial burn; this gradually cicatrises over, leaving a smooth shiny cicatrix, very different in appearance from the irregular scar which is the result of the ordinary surgical treatment.

We were astonished at the rapidity with which the lupus

nodules melted down and cicatrisation occurred. We were shown cases that previously had long resisted the older methods of treatment, and that within two or three weeks, as far as appearance went, were well. So long, however, as there is any local or general reaction to increasingly large injections, the patient cannot be regarded as cured; and Professor Levy, who has now had an experience of over two months, distinctly states that we cannot yet consider any patient as permanently cured. It is said, indeed, that relapse has taken place in one of the early cases.

This method is of interest as throwing light on the dispute as to the identity of lupus erythematosus with lupus vulgaris. Lewin (*Berl. Klin. Woch*, No. 52, 1890) obtained a marked local reaction, followed by great improvement, in a case of the former variety, which he therefore concludes is tubercular. Arning (*Deutsch. Med. Woch.*, No. 50, 1890) also observed considerable general and slight local reaction in two cases of lupus erythematosus, but he adheres to the apparently illogical opinion that the two varieties are distinct. The interesting case of lupus erythematosus before mentioned as now under treatment in the Bristol General Hospital has reacted locally and generally in a most marked manner, and therefore may be quoted in support of the identity of the two forms.

Several cases of anæsthetic leprosy have been injected. In two recorded by Arning (*loc. cit.*) there was absolutely no reaction; but we saw in King's College Hospital, under the care of Mr. Watson Cheyne, a patient in whom a most marked general reaction occurred, with the formation of a large bulla on the toe, and the appearance of a rash upon the chest and abdomen which is said to be identical in character with that met with in the initial stage of leprosy. On the other hand, Doutrelepont (*Deutsch. Med. Woch.*, No. 51, 1890) in a case of leprosy made five injections varying from 5 mgrs. to 3 cgrs., with a negative result. One case of tuber-

cular leprosy was injected by Engel-Reimer (*Deutsch. Med. Woch.*, No. 50, 1890), with some general, but doubtful local reaction.

In tubercular disease of *joints* and *bones* the influence of the treatment is marked. The affected part swells, and becomes more sensitive, and the skin over it is frequently reddened. If sinuses exist, there may be increased redness, swelling, and discharge. These phenomena quickly subside, and the part is left less swollen and less painful than before; and we were much struck with the rapid improvement that took place in tubercular joints: so that a child who, on admission, had all the symptoms of severe joint affection, speedily came to move the limb fairly freely, and evidently without pain. The surgeons informed us that they had never seen under any other treatment any approach to the rapidity with which improvement took place under the injections. We saw cases where sinuses in connection with diseased bones and joints, which had long remained open in spite of all previous treatment, rapidly and completely closed. It need not be pointed out that, as Koch's fluid acts only on living tuberculous tissue, it can have no influence where any deformity or interference with movement persists after active disease has disappeared. A good result, however, is not obtained in every case: for example, Czerny (*Deutch. Med. Woch.*, No. 51, 1890) reports the case of a man suffering from spondylitis, with discharging sinuses and some compression symptoms, but with complete sensibility and control of bowel and bladder; after a dose of 5 mgrs. complete paralysis of both sensation and motion up to the 6th dorsal vertebra occurred, with retention of urine, involuntary discharge of fæces, and formation of acute bed-sore. A week after the injection the spine was trephined, and pus was evacuated from the dura mater; the spinal cord was found to be œdematous. Ten days later no improvement in spinal symptoms had taken place. This is an illustration of the danger that

may result from the increased local exudation which the injection causes. In another case, also reported by Czerny (*loc. cit.*), a woman with tubercular knee with sinus, who could walk with crutches on admission, had an injection of 5 mgrs.; the joint became very painful and swollen: a second injection caused a similar local reaction, which was followed by the formation of a new abscess, with high fever. We also saw, under the care of Dr. Cornet, a boy with caries of the spine, who was distinctly the worse for the treatment; the fever in the reaction reached 104°F., and without any further injection the temperature went up in three days to over 105° F.

The chief point of interest with regard to tuberculosis of *glands* is the illustration which this condition affords of the theory of encapsulation before referred to. The reaction is apt to begin late and continue long (von Bergmann, *Therap. Monatsheft*, Nov., 1890). The usual local change is swelling and tenderness of the gland during the period of reaction, followed by gradual diminution in size. Suppuration does not commonly occur.

We pass now to the consideration of tuberculosis of the *throat* and *lungs*, to which we devoted special attention on account of the greater difficulty of forming a correct estimate of the value of Koch's treatment in the case of the respiratory tract.

When the *larynx* is affected, the local reaction may produce increase of pain on swallowing, if that has previously existed, increase of cough and expectoration, a feeling of dryness and constriction, greater hoarseness, and perhaps aphonia, and sometimes local pain. Contrary, however, to what we anticipated, we found that, as a rule, no serious obstruction to breathing was produced, and in many cases none at all. A dangerous œdema has, however, been noted by Krause (*Berlin Klin. Woch.*, No. 49, 1890); and we were told by Prof. Fränkel that death had occurred in a child

from the swelling induced. He further expressed the opinion that where ulceration existed there was less danger than in the case of infiltration alone, as in the former condition there was freer exit for the serous exudation produced in the reaction; and also that special care was necessary if the ventricular bands were swollen, as a slight increase of their size might seriously block the glottis. According to Lublinski (*Allg. Med. Cent.-Zeit.*, Nov. 29th, 1890), the treatment is not contra-indicated in any condition of tubercular disease of the larynx.

Where infiltration exists the mucous membrane swells and looks red and succulent, and the secretion from its surface is usually distinctly increased; it must, however, be remembered that a certain degree of congestion may be produced as the result of high temperature and increased cough. If ulcers are present, their margins become more swollen and reddened, the base appearing deeper, and there is increased discharge. As the injections are continued the local reaction becomes less marked, and the infiltrated parts shrink, usually without breaking down. Von Bergmann (*Therap. Monatsheft*, Nov., 1890), however, relates a case in which a tubercular mass in the front angle of the glottis became gangrenous, and was coughed out on the fourth day after injection; giant cells were found in it. The margins of ulcers become flattened, the base fills up with granulations, and epithelium spreads over the surface. We saw cases where the seat of former ulcers was marked only by slight depressions, covered with shiny new-formed epithelium. Prof. Fränkel informed us in conversation that in one case he could claim an absolute cure of laryngeal tuberculosis. We saw enough to convince us that much more is to be hoped from this method than from any other known system of treatment of laryngeal phthisis.

Krause (*loc. cit.*), however, cites a case where improvement had taken place under the application of lactic acid, and in

which the injections were followed at first by some benefit, but afterwards by great swelling of the larynx and adjacent parts and the formation of a deep persistent ulcer.

In the *lung* the disease exists under much more complicated conditions than in the localities before considered, and there is a corresponding difficulty in arriving at a due conclusion as to the local effect of the remedy. Not only is the affected tissue scattered more or less widely through and enclosed by healthy lung-tissue, but, except in the very earliest stage, the pathological changes special to tuberculosis are associated with those due to the existence of dead tissue, which is liable to act as a septic foreign body, and is moreover entirely outside the sphere of influence of the remedy; inasmuch as Koch's fluid acts only upon living tubercular tissue, and cannot affect caseous masses or the necrotic walls of cavities.

Where the lung is affected, the local reaction after injection shows itself by increase of cough, and the expectoration is usually increased in amount and altered in quality, becoming much more sero-mucous, and tending to lose its nummular and purulent character. In some cases we saw large quantities expectorated within a short time, the muco-purulent element floating in serous fluid so abundant as to suggest to us the idea that water had been put into the glass vessel into which the patient expectorated. Dyspnœa is very variable: in many cases it is absent; in others it is marked out of all proportion to the rise of temperature, the respiration sometimes reaching 60 or 70 a minute. Rarely the sputum is tinged with blood.

Pain and a feeling of constriction in the chest are often present, not necessarily localised by the existing disease, and often apart from physical signs; sometimes, however, due to pleurisy, as indicated by the occurrence of friction. Experience differs with regard to the tendency to pneumonia, but typical lobar pneumonia running the usual course has been

described as directly induced by the injection. We saw cases of great interest in which physical signs of consolidation rapidly appeared during the reaction, and as quickly disappeared with the fall of temperature; in some instances recurring with subsequent injections and running the same course. The fugacious character of the phenomena suggests as an explanation, not the occurrence of an ordinary pneumonia, but a rapid exudation of serum into the lung-tissue analogous to that which takes place in lupus. If this exudation extends over a large area, it may block the lung-tissue to a dangerous degree.

The usual result of the treatment is as follows:—Cough and expectoration tend to diminish, and in some cases they practically cease. The bacilli may become fewer, and have been described by Fraentzel (*Therap. Monatsheft*, Nov., 1890) as stunted and altered in shape. It is, however, recognised that in old cavities the bacilli frequently undergo similar changes; so that the presence of these modified forms may simply be due to the clearing-out of old cavities, and not to the direct influence of the treatment upon the micro-organism. Ewald (*Berl. Klin. Woch*, No. 51, 1890) has demonstrated this within the last few weeks in patients not injected. It must also be remembered that the bacilli are not distributed regularly through the sputum, and that therefore too great stress must not be laid on the exact number of these organisms contained in any given specimen. This probably accounts for the frequent variation in the number of bacilli described in some cases. Bacilli sometimes make their first appearance in cases while under treatment: for example, we saw a patient with chronic serous pleurisy which had been treated by aspiration, and in whom before injection cough, sputum, and bacilli were absent; as a result of the reaction, râles appeared in the chest, and sputum containing bacilli was expectorated. We found that most patients lost weight under the treatment, usually in direct proportion to the intensity

and duration of the reaction; and many of them complained of increased weakness. Nightsweats were generally diminished, and often disappeared. Many patients told us that they felt able to breathe more freely.

Little can be said with regard to improvement in physical signs: in some cases râles and dulness are said to have diminished, and bronchial breathing to have been replaced by vesicular; but as yet time is too short to allow of decided evidence on this point. Koch claims to have completely cured two phthisical patients, with one of whom we had the opportunity of speaking.

The earlier the stage of lung disease, the greater is the prospect of benefit; and in advanced cases the adoption of the method is usually contra-indicated. One source of danger is illustrated by Group V., charts 14 and 15, which show fever originated by injection; and several cases of advanced phthisis with cavities have died from exhaustion, as we were informed, owing to the persistence of the high fever directly set up by the treatment.

We also saw a patient in whom, during three weeks' treatment, the disease markedly extended in both lungs, and cavity formed; dyspnœa—absent before—made its appearance; bacilli, previously few in number, became numerous, and the sputum was increased in amount.

Important observations have been made bearing upon the tubercular origin of serous pleurisy. (See chart 16.) We saw cases of this disease with no recognised lung complications in which distinct reaction was obtained, and we were repeatedly told that such reaction had occurred in all cases of serous pleurisy as yet injected. Many of our informants held strongly that serous pleurisy was always followed by tuberculosis, a statement which we conceive is hardly in accordance with much of our own experience. Lindner (*Deutsch. Med. Woch.*, No. 51, 1890) records a case of fistulous empyema in which no reaction was obtained, but

also quotes an instance in which definite reaction took place; and we saw a thoracic fistula following empyema in which the local reaction—swelling, redness, and increased discharge—was pronounced.

The remarkable affinity of the fluid for tubercle, wherever it may exist, sometimes leads to the discovery of disease in localities where the most careful examination has failed to reveal its presence. Whilst this characteristic is of the greatest value in diagnosis, it adds an element of grave danger to treatment, as it is absolutely impossible to say what may be the result of the injection in any given patient. This is most forcibly illustrated by a fatal case which occurred at Innsbruck. Jarisch (*Wiener Klin. Woch.*, No. 50, 1890) injected 2 mgrs. into a girl seventeen years of age suffering from extensive lupus, but apparently in all other respects healthy, except for occasional slight diarrhœa. The temperature reached 106.5°, and the girl soon became comatose, and died in thirty-six hours. Post mortem examination revealed numerous disseminated pneumonic patches, with œdema of both lungs, great œdema of brain and spinal cord, acute swelling of chronically enlarged spleen, cloudy swelling of liver and kidneys, and capillary hæmorrhages into lung, pleura, pericardium, thymus and spinal cord. In the abdomen, stricture of the bowel from old ulceration existed, with tubercular deposits and ulcers in a state of acute inflammation. Some of the glands in the abdomen were infiltrated and cheesy. Four other patients inoculated with the same lymph showed the ordinary reaction.

Where there is reason to suspect disease of the nervous centres, the treatment should not be adopted. At a post-mortem examination of a child under the care of Henoch (*Berlin Klin. Woch.*, No. 51, 1890), that was injected when moribund from tubercular meningitis, Virchow said that he had rarely found such an extreme degree of hyperæmia of the brain and meninges—a condition contrary to what is

Description of Charts.

GROUP I.

TYPICAL REACTION.—Charts 1, 2 and 3.

CHART 1.—*Male, aged* 45. *Phthisis. Bacilli.*

Normal temperature for twenty-two days prior to first injection. Illustrates diminished reaction to increased dose.

CHART 2.—*Female Phthisis. Bacilli.*

Illustrates diminishing reaction to increasing dose. Also, it will be observed that the reaction is double, there being a second rise of the temperature on the day following injection. (See also Chart 9.)

CHART 3.—*Female, aged* 15. *Phthisis. Bacilli.*

Shows at first increased reaction to increased dose, but later the typical diminishing reaction under large dose. Temperature before first injection for some time was of somewhat hectic type, the tendency to which can be still recognised.

GROUP II.

INCREASE OF REACTION WITHOUT INCREASE OF DOSE.

Charts 4, 5, 6, and 7.

CHART 4.—*Female, aged* 19. *Erysipelas. Unsuspected Tuberculosis.*

Local reaction appeared in tonsils, pharynx, and larnyx after third injection, and in a gland in the neck, site of abscess six years ago; also previously existing ulcers of vagina became more inflamed, with increased discharge. A few râles at base of left lung, not considered due to tubercle. Shows increased reaction to diminished dose.

CHART 5.—*Female. Unsuspected Tuberculosis.*

In reaction, eruption of miliary tubercular nodules (?) on pharynx and base of tongue. Some enlargement of salivary glands. Shows first slight diminution of reaction to same dose of 2 mgr., followed by increasing reaction to repeated doses of $2\frac{1}{2}$ mgr.

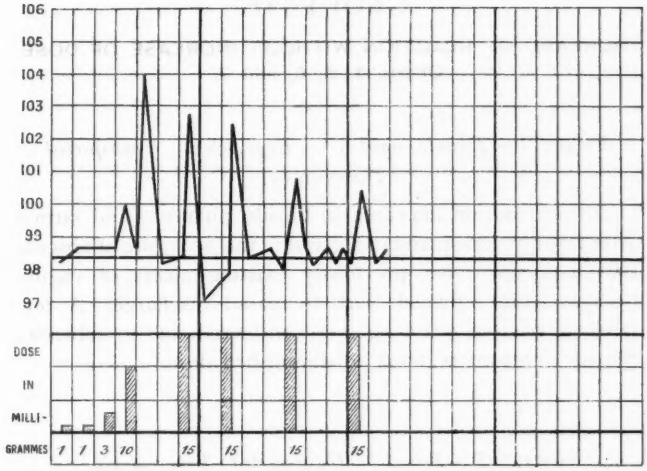
CHART 6.—*Female, aged* 14. *Lupus of Face.*

Improving under treatment. Shows increased reaction to constant dose.

CHART 7.—*Female, for some time under treatment for Tabes Dorsalis.*

On injection, reaction in larynx, pharynx, and apices of both lungs. Shows increased reaction to repeated doses of 3 mgr.

CHART Nº 1.



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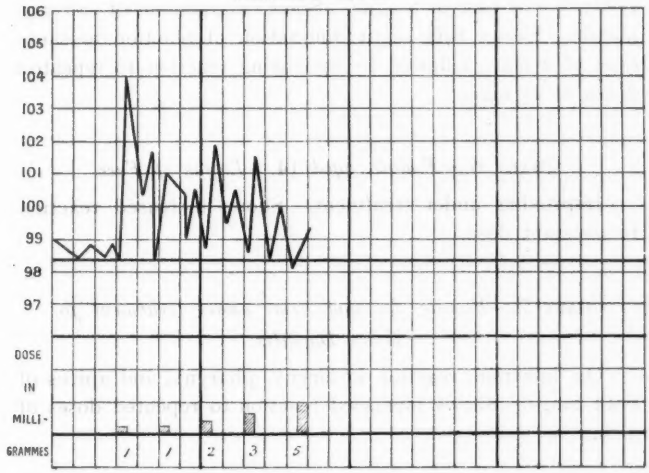

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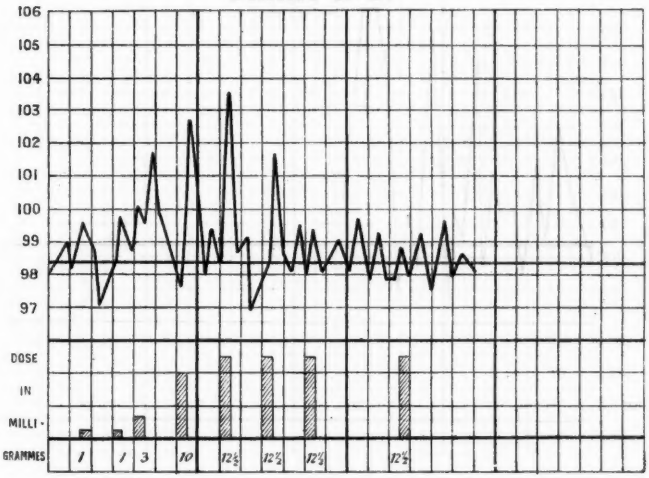

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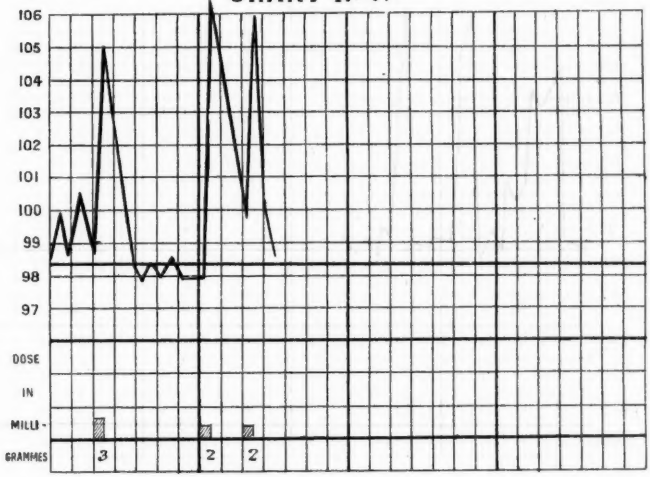

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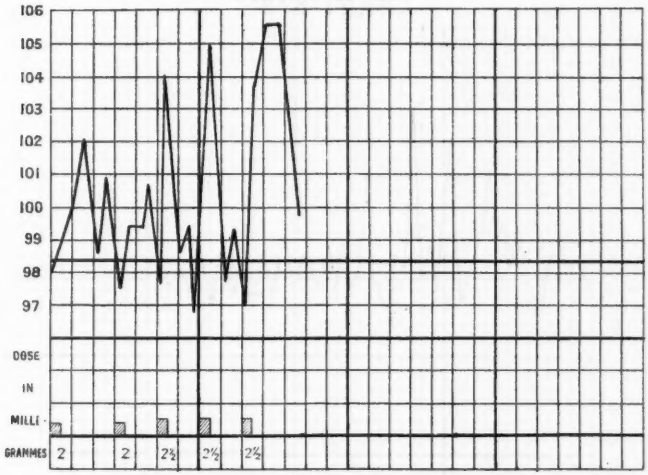

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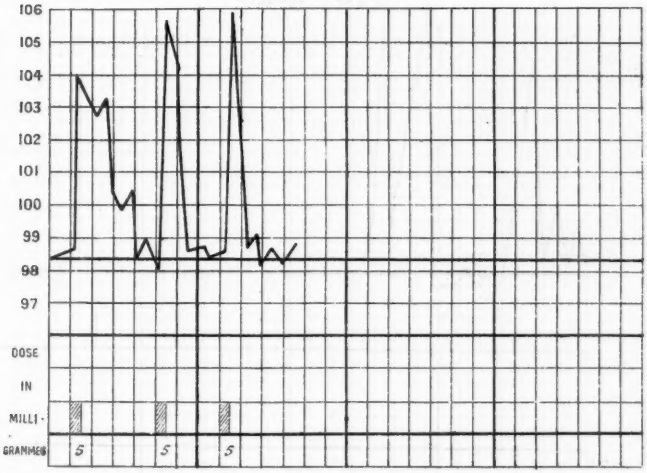

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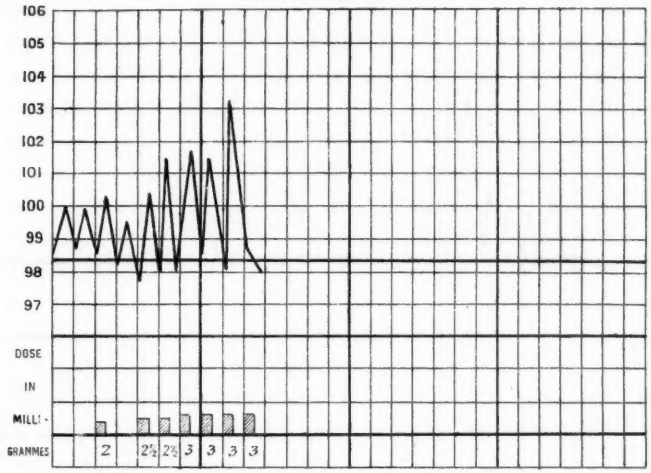

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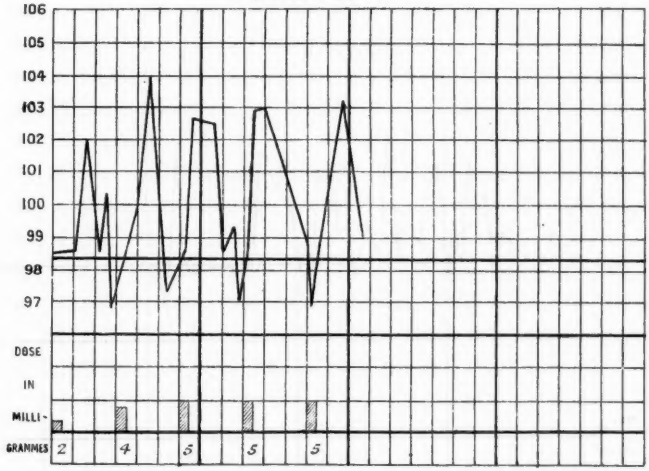

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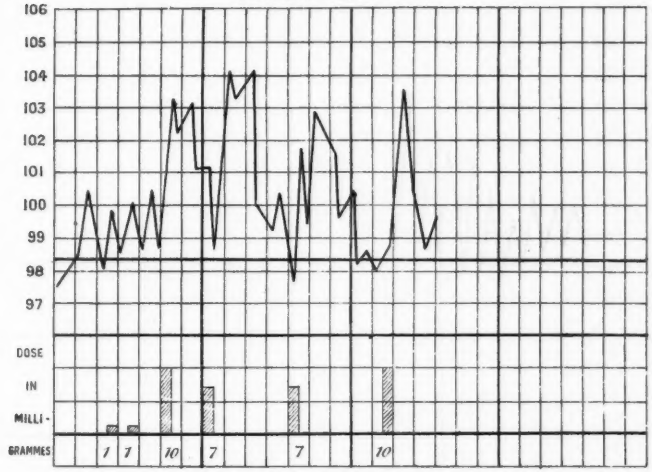

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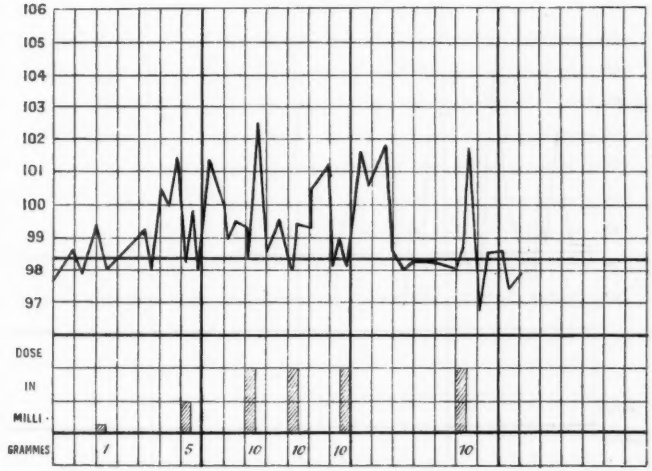

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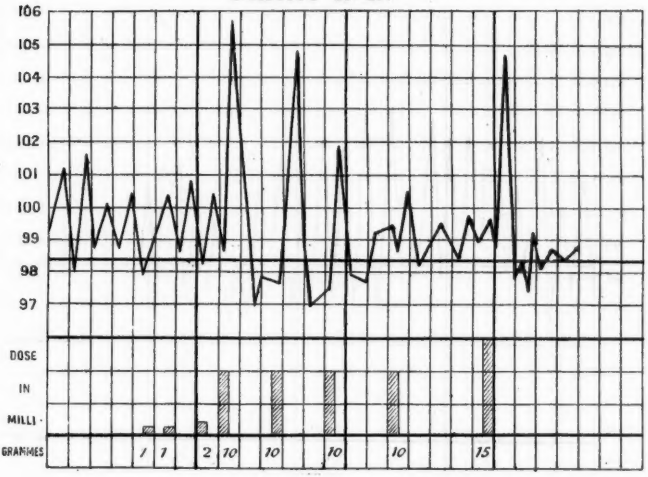

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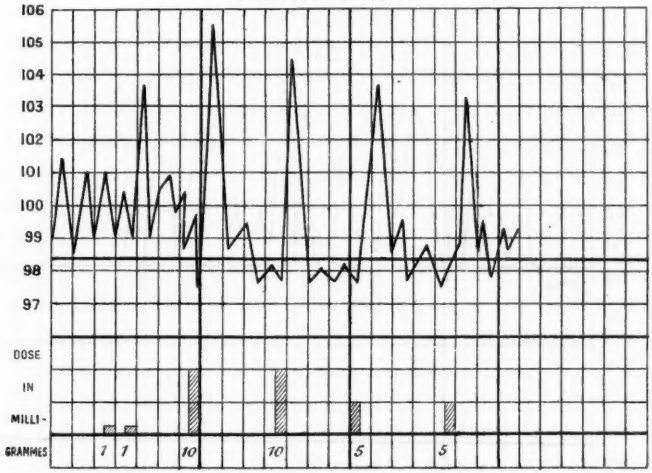

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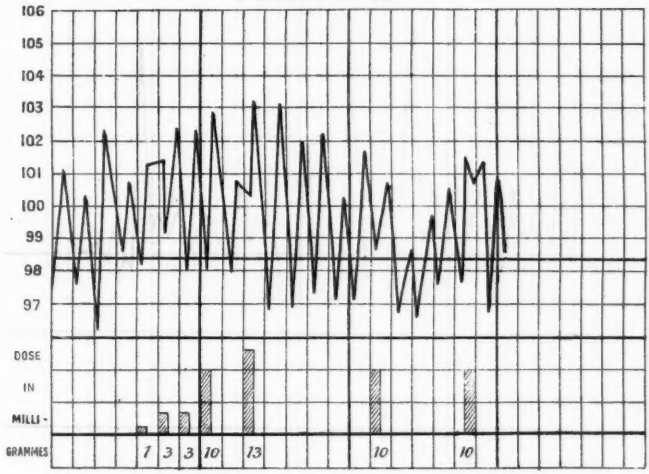

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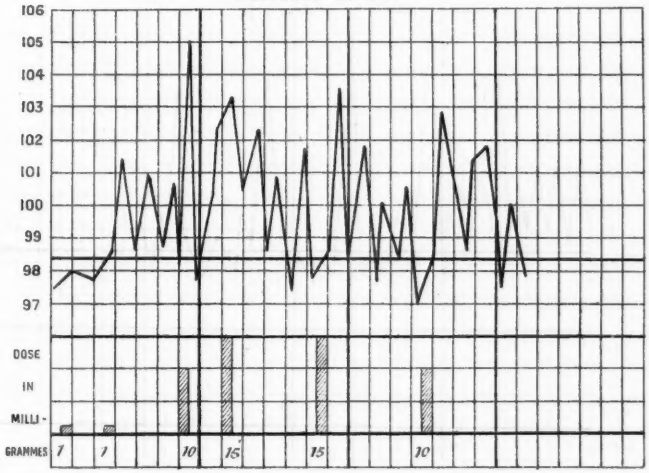

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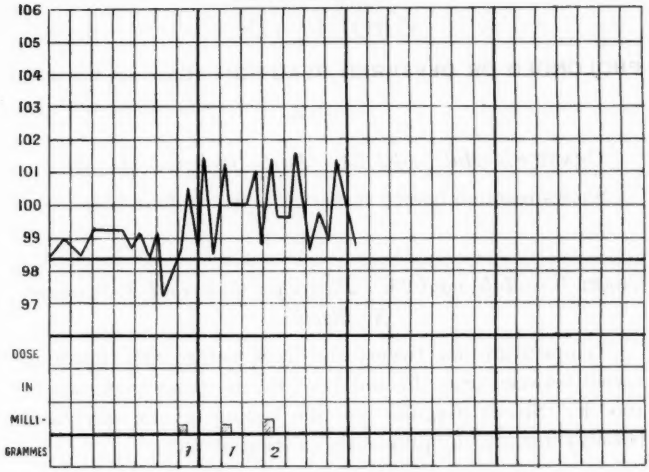

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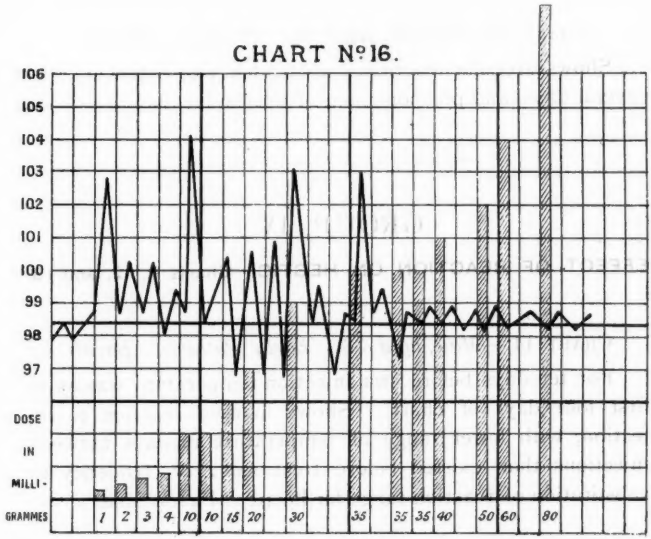

GROUP III.

PROLONGED OR DEFERRED REACTION.—Charts 8, 9 and 10.

CHART 8.—*Male, aged* 31. *Early Phthisis. Bacilli.*

Shows reaction lasting from two to nearly four days.

CHART 9.—*Male, aged* 24. *Pleurisy; Catarrhal Pneumonia. No Bacilli.*

Temperature for twenty-one days before first injection varied between 98.6° F. and 102° F., the mean being about 100° F. Shows irregular reaction lasting several days, and possibly modified by previously existing hectic.

CHART 10.—*Female, aged* 38. *Phthisis. Bacilli.*

Shows irregular reaction, with tendency to extension over several days, and postponement of maximum rise.

GROUP IV.

EFFECT OF REACTION ON HECTIC.—Charts 11, 12, and 13.

CHART 11.—*Male, aged* 33. *Early Phthisis. Bacilli.*

For ten days before first injection temperature was as in first four days of chart. Shows marked reaction to injection, with lower range of temperature in days between injections than existed before treatment; *i.e.* tendency to substitution of reaction range for hectic. Favourable.

CHART 12.—*Male, aged* 35. *Phthisis. Bacilli.*

Hectic for forty days prior to injection. Shows same type as in chart 11.

CHART 13.—*Male, aged* 17. *Phthisis. Bacilli. Diarrhœa; Urogenital Tuberculosis.*

Shows hectic temperature, in which reaction cannot be recognised.

GROUP V.

FEVER ORIGINATED BY INJECTION.—Charts 14 and 15.

CHART 14.—*Male, aged* 20. *Phthisis, rather advanced. Bacilli.*

Temperature subnormal for twelve days before first injection. Shows reaction, with hectic temperature on intervening days.

CHART 15.—*Male. Phthisis. Bacilli.*

Shows fever produced by injection, and persisting apparently independently of it.

CHART 16.—*Female. Serous Pleurisy. No Bacilli.*

Temperature normal for some time before injection. Shows reaction in serous pleurisy, apart from other evidence of tuberculosis. (See p. 13.) Also illustrates marked reaction to small doses at first, with rapidly established tolerance of large doses.

usually seen in this disease, and in this case held to be directly due to the injection. It was reported in Berlin that death from tubercular meningitis had occurred in several cases, but we were unable to ascertain the details. Even where there is no evidence whatever of the existence of cerebral disease symptoms of hemiplegia have been developed during the reaction, to disappear again with it; suggesting the presence of tubercular disease within the cranium. Dr. Frank also told us that he had seen a child, suffering from suppurative middle-ear disease, in which paralysis of the facial nerve of the same side came on after injection.

Further, one of the cases seen by us, in which there was most marked lung-reaction, had been examined again and again without the detection of a single suspicious sign. We also saw many patients in whom the injection revealed in very varied parts previously unsuspected tubercle.

It is therefore clear that in no case, even the least suspicious, should an injection be made without the most careful and thorough preliminary examination; in spite of which the remedy will now and again demonstrate the existence of disease which has escaped the most skilled investigation.

From this it follows that the greatest caution must be observed in the matter of dose. This is necessary for several reasons: (*a*) On account of the possibility of the existence of unsuspected disease; (*b*) Because of the progressively increasing reaction not uncommonly met with, as illustrated in charts 4, 5, 6, and 7, Group II.; (*c*) Because of the want of any definite relation between the nature or extent of the lesion and the amount of reaction to be anticipated; (*d*) Owing to the prejudicial effect of high reaction; for it must be clearly understood that the reaction is in itself an evil, and causes, as before described, loss of flesh and strength. The tendency in Berlin is now towards smaller doses, and the distinction is drawn between the experimental dose which demonstrates

marked reaction at the expense of the patient, and the therapeutic dose.

In tuberculosis of the lungs and larynx the initial dose should be 1 mgr., which is gradually increased; and it is well to allow the patient one or more fever-free days between the injections, in order that he may make up some of the ground that he has lost during the reaction. Cases of lupus of small amount and in the usual positions generally stand larger doses, but even in these no harm can be done by giving 1 mgr. at the first injection; where, however, the disease exists in several positions, or is associated with any irregularity, the initial dose should never exceed 1 mgr. It must be borne in mind that the treatment in any given case of phthisis will have to be continued over a considerable time—probably some months,—and that, consequently, it should not be undertaken unless a sufficient supply of lymph can be secured. If only a few doses can be given, it is useless to subject a phthisical patient to the discomforts and undoubted risks specially attendant upon the earlier injections, as these will have to be faced *de novo* when the treatment is resumed at a later time.

In children great care is always necessary. We saw in Prof. Langenbuch's Klinik a child, $3\frac{1}{2}$ years of age, in which $\frac{1}{5}$ mgr. produced a most pronounced reaction, the temperature reaching nearly 105° F.

For purposes of *diagnosis*, absolute reliance cannot be placed upon the result of a single injection. We have seen a case of established phthisis, with bacilli, in which no reaction occurred until the dose had reached 1 cgr. (which, it will be remembered, produces slight reaction even in health); and we were informed that this was by no means a solitary instance. On the other hand, reaction has been met with in patients who otherwise presented no evidence whatever of tuberculosis—as in the case of a girl with post-scarlatinal nephritis. The factor of idiosyncrasy has probably to be reckoned with here; and just as sometimes a poisonous effect

will be produced by a dose of morphia or strychnia that is in most cases innocuous, so, in the case of the fluid under consideration, a patient may now and again be met with who, although untainted by tuberculosis, is yet exceptionally sensitive to the injection, and presents the reaction that in others is characteristic of this disease.

The evidence at present at our disposal warrants the conclusion that the beneficial effect of the remedy is undoubted in tuberculosis of the skin, bones, joints, glands, and throat. With regard to pulmonary phthisis, whilst there is good reason to hope that in suitable cases a most satisfactory result may be obtained from this treatment, sufficient time has not as yet elapsed to allow of the formation of any accurate estimate of its value.

Time also alone will show how far any improvement will be permanent; and when it is remembered that the fluid does not destroy the bacillus itself, it is not on theoretical grounds unlikely that a fresh invasion may be made of soil that has already been proved to be congenial to the development of the micro-organism.

DEMONSTRATION OF KOCH'S TREATMENT OF TUBERCULOSIS.

BY

F. J. WETHERED, M.D., M.R.C.P.

GENTLEMEN,

I must thank the Staff of the Royal Infirmary for the honour they have conferred upon me by inviting me to come down and give this demonstration. I do so all the more willingly, as it gives me the greatest pleasure to once more see my old teachers and fellow-students around me, and to visit the Hospital in which I received my first lessons in medicine.

We have all of us to thank Dr. Douglas Powell for so kindly giving the lymph from his scanty supply for the purpose of this demonstration; and also Dr. Heron, who has generously promised to send a further supply for the further treatment of the cases which I propose to bring before your notice.

Perhaps no announcement has ever made more sensation in the medical world than that made by Dr. Robert Koch at the late International Medical Congress; *i.e.*, that he had discovered a remedy which conferred on the animals experimented on an immunity against inoculation with the tubercle bacillus, and which arrested tuberculous disease.

Since then numerous experiments have been made on the human subject with the most satisfactory and marvellous results; and although the term used by the lay press, "Koch's Cure for Consumption," is somewhat premature, we un-

doubtedly have in Koch's lymph an agent possessing powerful remedial properties, and a peculiarly selective action on tubercular tissue.

Professor Koch's Paper, published in the *Deutsche Medicinische Wochenschrift* for November 17th, is by this time, doubtless, familiar to all of you, and I will merely touch upon the chief points contained in it.

As regards the preparation and nature of the remedy we as yet know nothing. Koch has been greatly blamed by some (in my opinion very unjustly) for not disclosing the process by which the lymph is obtained; and some have even gone so far as to class it as a quack medicine. But surely a discovery emanating from such a pure and scientific mind as that of Robert Koch cannot be classed in the same category as the patent medicines of unknown composition.

In an interview which Dr. Douglas Powell had with Dr. Koch, and at which I was present, Dr. Powell asked the Professor if he could give any idea, however meagre, to the English profession as to the nature of his lymph. Dr. Koch replied that he could not at present, for his investigations were as yet incomplete; and that we are dealing with a substance of whose chemical nature we are still quite ignorant. He went on to say that the method of manufacturing the lymph is an extremely complicated one; adding force to this statement by saying that he had had two assistants, experienced bacteriologists, studying in his laboratory for two months, and yet at the end of that period, they were still unable to carry out the complicated and difficult stages without his supervision. And again, if he were at once to publish the process in its incomplete state, hundreds of chemists and others, all over the world, would attempt to manufacture the substance, and declare themselves successful, with the result that either a perfectly inactive, or else a most dangerous, material would be produced; in either case working irretrievable injury to what promises to be one of the most

valuable medical discoveries yet made in the history of medicine.

The lymph as distributed is a clear, brownish fluid, not unlike bromine water in appearance. It requires to be considerably diluted before use, and in this state will not keep as long as the original fluid; bacterial growths soon develop in it, it becomes turbid, and is then unfit for use. In order to prevent this, it is most conveniently prepared with a half-per-cent. solution of carbolic acid.

The method of dilution is as follows:—1.c.c. of the lymph is measured out by means of a pipette, and placed in a graduated measure. To this, 9 c.c.c. of the half-per-cent. solution of carbolic acid is added, thus forming a solution of one in ten of the original fluid. This preparation will keep well for some time. When required for use, 1 c.c. of this dilution is measured out, and 9 c.c.c. of the carbolic acid solution added, thus forming a 1 per cent. solution of the lymph. And it is this dilution that is used for injecting. Thus, if 1 c.c. of this solution be injected, the dose used is 0.01 of the original fluid; whilst if 1 milligramme be used, the dose will be 0.001.

The injections are given by means of syringes holding one cubic centigramme, and graduated in milligrammes.

What is known as Koch's syringe consists of a small glass tube, upon which the graduations are marked. To the upper end of this fits a small balloon, fitted with a stop-cock; and to the lower end of the tube, an ordinary hypodermic needle.

To use it, the glass tube is filled from above, the lower end being closed by means of the finger. The balloon is then fitted on, and the tap turned off, so that no fluid can escape. The needle is then attached, and the puncture made. The tap is then turned on, and as much liquid as is required expelled by means of pressure on the balloon. The tap is then again turned, and the needle withdrawn.

This syringe has the advantage of being easily cleaned; but, unless in very experienced hands, is awkward to manipulate. Another syringe, known as Overlach's syringe, is as easily cleaned as Koch's, and is as easily worked as an ordinary hypodermic syringe.

Before use, the syringe must be carefully disinfected by means of absolute alcohol, and then rinsed out with distilled water, as alcohol causes a cloud with Koch's fluid.

The spot usually selected for injection is the skin between the shoulder-blades, partly because this region is so little sensitive, and partly because absorption is said to take place there more rapidly.

The dose to be given varies with the seat and extent of the disease, and also the strength of the patient. Roughly speaking, it may be said to vary inversely with the extent of the active tubercular disease—that is to say, the greater the lesion, the less the dose. This statement applies more particularly to pulmonary tuberculosis. The maximum dose given in this disease is 0.01 of the original solution, and this is the quantity usually given in lupus. In phthisis, the first dose is usually only 0.001. The doses, however, will be again referred to later on.

After an injection has been given, certain phenomena, local and general, present themselves, the combined symptoms being known as the reaction. It is a remarkable fact that a dose which will produce a reaction on a tubercular patient has no effect on a non-tubercular one. This agent, therefore, is of great value as an aid to diagnosis.

Professor Koch made an injection upon himself of 0.25 c.c., and thus describes the symptoms which followed:—

"Three to four hours after the injection, there came on pain in the limbs, fatigue, inclination to cough, and a difficulty in breathing, which speedily increased. In the fifth hour, an unusually violent attack of ague followed, which lasted almost an hour. At the same time there was

sickness, vomiting, and rise of bodily temperature up to 103.20 F.

"After twelve hours, all these symptoms abated. The temperature fell, until next day it was normal; and a feeling of fatigue and pain in the limbs continued for a few days, and for exactly the same period of time the site of injection remained slightly painful and red."

As far as we know at present, no healthy human being will react to a less dose than 0.01. If then this dose be given and no reaction follows, we may say no tubercular disease exists. But if only a slight general reaction occurs, without any local symptoms, another injection of 0.005 must be used. And if a reaction still occurs, it must be inferred that a tubercular lesion does exist, although its site may be obscure. There is now a remarkable case of this kind at Victoria Park Hospital. A girl, aged 18, who was apparently convalescent from anæmia, was given a dose of 0.01. Her temperature rose to 101°. Two days afterwards a second injection of 0.005 was given. Again the temperature rose to 103.2°; the only local symptoms being slight swelling of the knees. Careful physical examination elicited no evidences of tuberculosis. A third injection produced a rise of 100°. The dose was then raised once more to 0.01, which produced a rise to about 102°. Further injections of the same dose were given, each time with a diminishing action. Up to the present time, however, no other manifestations of tubercle have presented themselves. The patient is perfectly well in herself. How the case will end, time alone can show.

I now pass to the reaction which takes place in a tubercular patient. From seven to ten hours after the injection there is generally a rigor, followed by a rise of temperature to 101° and upwards. In one case, at Victoria Park, it rose to 105.7°; and in a case which I saw at Von Bergmann's Clinic at Berlin, a temperature of 106° was reached. This fever is accompanied by pain in the limbs, a tendency to cough, a

feeling of weakness, often nausea and vomiting. Occasionally there is slight icterus, and not infrequently a cutaneous eruption, somewhat resembling that of scarlet fever, is observed. This eruption, in one case which came under my notice—one of lupus,—appeared immediately after the first injection, gradually faded, but reappeared after the second injection, which was given a week later, again to fade and come back again at each subsequent injection.

There is slight itching, but, otherwise, no discomfort. The reaction usually lasts from 12 to 15 hours; and as soon as it is over, the patients feel comparatively well. The temperature, as a rule, falls by a crisis; but in some case is maintained for two or three days, and then comes down by lysis. There is often a secondary rise sometimes higher than the primary one, on the day following the injection.

The chart which I now show, taken from a patient under treatment at Victoria Park, exhibits the reaction very well. It is a case of phthisis in a man aged 49. There were well-marked signs of active disease in the right apex. The first injection was given November 29th, 0.002; the temperature then being 100.2°; it then fell but rose again, reaching its maximum, 103.8°, nine hours after injection; it then fell suddenly to 101.2. The patient complained of slight chilliness, profuse sweats as the temperature fell, and slight frontal headache. The pulse rose from 88 to 102. After injection the crepitations became less abundant and smaller, and the breath sounds weaker. There was no alteration in the expectoration. The second injection of the same dose was given two days afterwards; ten and a quarter hours afterwards the patient complained of feeling rather hot, the temperature being 101.6°. As will be seen from the chart, the temperature began to fall fourteen and a half hours after the injection, and fell naturally, reaching the normal about twenty hours after the injection.

The local reaction can naturally be best followed in cases where the tuberculous affection is visible; the most characteristic example of which is, of course, in cases of lupus. A few hours after an injection, the lupus spots begin to swell and to redden, and this they generally do before the initial rigor. During the fever the swelling and redness increase, and around them appears a dark-red zone of variable extent, presenting an appearance very much as if an attack of erysipelas had supervened upon the lupus. The submaxillary glands often become swollen and tender. A thin yellow serum then exudes, which quickly dries, forming thick yellowish crusts, which fall off after two or three weeks, leaving a clear red cicatrix behind. Very often a part of the face in which lupus was not previously recognisable, partakes in the local reaction; and when this has subsided, a desquamation of the cuticle follows, which seems to indicate that disease existed in this part, although invisible to ordinary clinical observation.

As regards its precise action on tuberculous tissue, nothing as yet can be said with certainty. Dr. Koch says that the tubercle bacilli themselves are not destroyed, but only that the tissue enclosing the tubercle bacilli is affected by the remedy. Besides this, there is, as is shown by the visible changes in its nutrition, which cause the tissue to die off more swelling and redness, considerable disturbance of the circulation, and evidently, in connection therewith, deeply-seated or less quickly or deeply, according to the extent of the action of the remedy. In Dr. Koch's Paper he states: "The remedy can only influence living tuberculous tissue. It has no effect on dead tissue, as, for instance, necrotic cheesy masses, necrotic bone, etc.; nor has it any effect on tissue made necrotic by the remedy itself."

How far surgical interference can aid in this treatment by removal of the dead tissue, future observations can only show. It is possible that although the bacilli are not directly killed

by this agent, yet they may be starved, so to speak, by the destruction of the pabulum on which they feed.

I now turn to the various forms of tuberculosis as treated by this method. My own experience, which has necessarily been short, has lain chiefly with phthisis and lupus; Dr. Heron having kindly asked me to assist him in carrying out a series of cases at the Victoria Park Chest Hospital. Our cases hitherto have been almost entirely confined to early cases of phthisis. Some of these have been already published in detail in the *British Medical Journal* for December 6th, and for a full account of them I would refer you to that paper. Our impressions, so far, have been decidedly favourable. Improvement has manifested itself in nearly every case. Cough and expectoration generally increased a little after the first injection, and then grew less and less. The microscopical examination of the sputum gave very interesting results. In all the cases bacilli had been found previous to the commencement of the treatment. These gradually diminished in numbers, and in some cases entirely disappeared, previously exhibiting certain changes of form, such as swelling at the ends, and collecting in groups of what appeared to be broken-up bacilli. But I have not yet been able to convince myself that these changes are at all constant. More striking changes appeared when the sputum was examined without the use of stains. Large leashes of elastic tissue, showing a well-marked alveolar arrangement, were then seen, far more numerous and complete than occur even in the most acute cases of phthisis. This would seem to show that a similar process is going on to what takes place in lupus. In addition to these changes, the expectoration gradually becomes more mucoid. Simultaneously the night-sweats ceased, the patients' appearance improved, and they are increasing in weight.

The course of treatment is generally as follows: An injection of 0.001 c.c. is first given. If a reaction occurs, the same dose is repeated once a day, until no reaction can be

observed. The dose is then raised to 0.002 c.c., until this is also borne without reaction; and so on, until the maximum dose of 0.01 c.c. is reached. This dose is given for several days and if no reaction occurs; we draw the conclusion that the patient is at present free from all active disease. How long this state of affairs will last, of course, we cannot at this juncture say. We can only hope it may be permanent. Of advanced cases of phthisis I have as yet had no experience, but reports received from Berlin are not encouraging.

As regards the treatment of lupus I have already described the local reaction which occurs, and it only remains for me to speak about the doses. On this point I cannot too deeply impress my hearers with the need of great caution. The usual dose has hitherto been 0.01 for the first injection; but this is often followed by hyper-pyrexia, coma and delirium, which it is needless to say are dangerous symptoms. At Victoria Park, therefore, we now give 0.005 for the first dose; the second not being given before the end of a week. In this manner we completely avoid all such symptoms.

Tubercular joint disease gives most satisfactory results, so far as can at present be judged. I saw several cases in Berlin which impressed me greatly. Notably, two cases of hip-joint disease in children. In one, that of a little boy aged six, the left leg had been fixed in the first position for six weeks. It was exquisitely painful, and the child screamed whenever touched. The little patient was laid in bed without any weights or other apparatus. After a week's treatment, during which three injections had been given, the child was practically perfectly well. He could move his leg freely, and allowed it to be manipulated without fear.

Of tubercular laryngeal disease, I can say but little. I saw some of Dr. Krause's cases in Berlin, but I cannot say that they impressed me favourably.

Dr. Watson Williams has been in London this week, and

has seen Sir Morell Mackenzie's cases, and informs me that the results there are very promising.

I have only seen one case of acute miliary tuberculosis treated by this method; no effect was produced by the injections. The agent has, I believe, been twice tried on cases of tubercular meningitis, each time with a fatal result.

In concluding this part of my address, I should like to state that there are now in London a very good series of typical cases being treated at several hospitals, especially at King's College, Middlesex, Golden Square, Brompton, and Victoria Park Hospital. They are all open to the inspection of medical men; and any of you who wish to see this treatment, and study it carefully for yourselves in all its bearings, cannot do better than pay a visit to the metropolis, where, I am sure, you will find much to interest you. I hope that before long the supply of lymph will become more general, so that you will have the opportunity of following the cases both here and at the Bristol General Hospital.

J. W. Arrowsmith, Printer, Quay Street, Bristol.